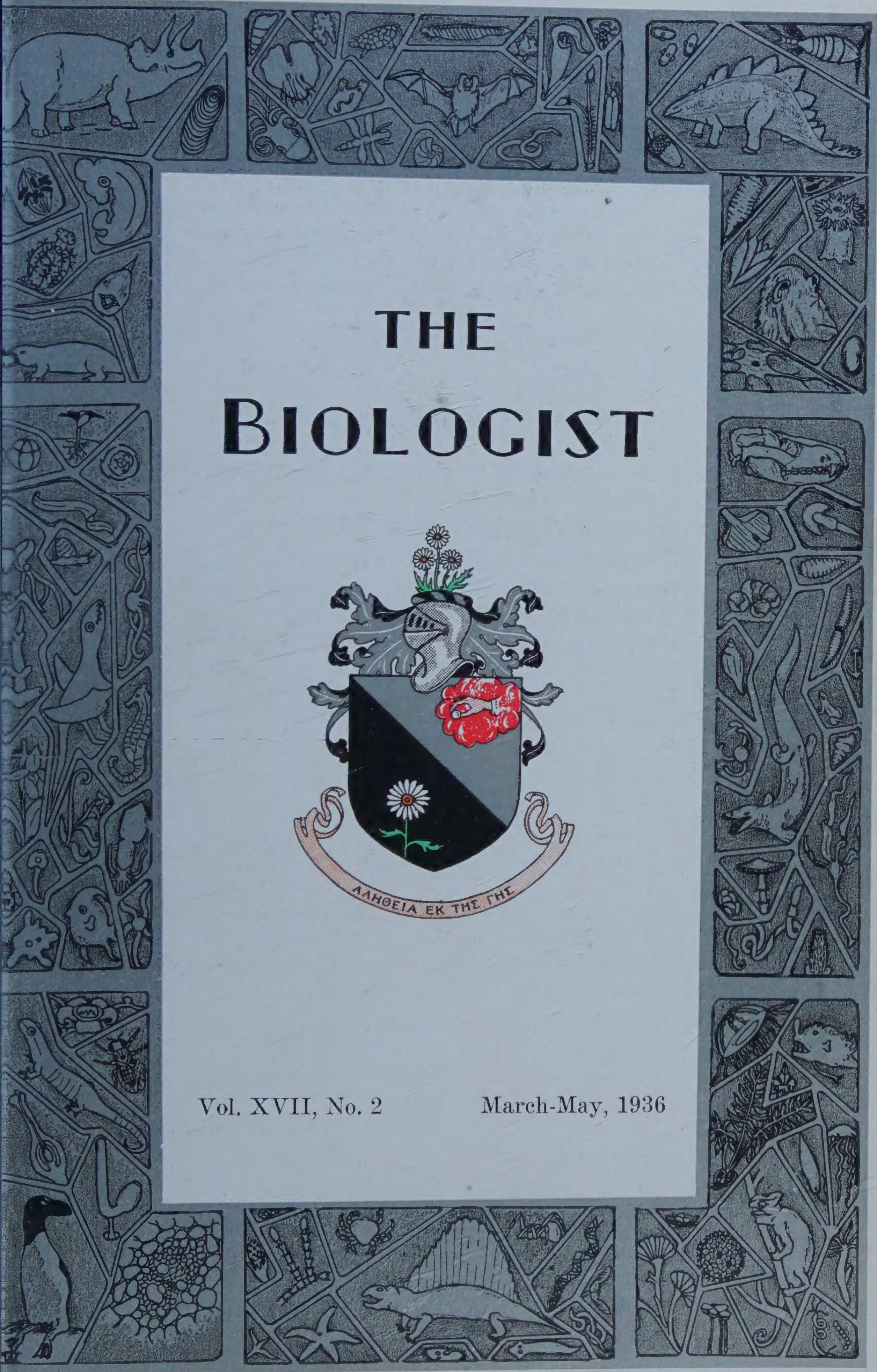
MALE DECADENCE . . . . CAUSEY



THE

BIOLOGIST

ΑΛΗΘΕΙΑ ΕΚ ΤΗΣ ΓΗΣ

Vol. XVII, No. 2 March-May, 1936

ONVENTION REPORTS

PHI SIGMA

BIOLOGICAL HONOR SOCIETY

"The object of Phi Sigma is to promote interest in biological research. Although originally designated as an honorary biological research society, it should now be considered as a working guild of biologists interested in research. In effect, election to Phi Sigma should be an opportunity for better work, rather than merely election to an honorary society."

Mile Posts:

1915	March 17, Alpha Chapter organized, Ohio State University.
1916	May, Central Governing Body organized, BIOLOGIST first issued.
1917	June, last War-time BIOLOGIST issued.
1921	February, BIOLOGIST revived.
1924	December, First National Convention, Constitution revised, Washington, D. C.
1925	December, Second National Convention, First Scientific Program, Kansas City.
1926	December, Third National Convention, Second Science Program, Philadelphia.
1927	December, Third Science Program, Nashville.
1928	December, Fourth National Convention, Coat-of-Arms adopted, Fourth Science Program, New York.
1930	January, Council Meeting, Ritual Revised, Norman, Okla.
	December, Fifth National Convention, Fifth Science Program, Cleveland.
1931	Phi Sigma Letters Registered, U. S. Patent Office.
1932	December, Sixth Science Program, Atlantic City.
1933	June, Sixth National Convention, Seventh Science Program, Chicago.
1935	December, Seventh National Convention, Eighth Science Program, St. Louis.

Expansion:

The Constitution provides that: "An active chapter may be established in any institution of learning which requires for graduation the equivalent of four years of collegiate work, and which is equipped with facilities for research work. - - - - Any petitioning group must be active for at least one year before it may be granted a charter."

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DIRECTORY

OF ALL ACTIVE AND INACTIVE CHAPTERS

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ALPHA

Ohio State University, Columbus, Ohio, founded March 17, 1915, (Inactive).

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IOTA

Washington University, St. Louis, Missouri, founded May 28, 1921.

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University of Kansas, Lawrence, Kansas, founded May 31, 1921.

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University of California, Berkeley, California, founded April 27, 1922.

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University of Nebraska, Lincoln, Nebraska, founded May 3, 1934.

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University of North Dakota, Grand Forks, North Dakota, founded May 26, 1924, (Inactive).

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RHO

University of Illinois, Urbana, Illinois, founded March 28, 1925.

SIGMA

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Montana State College, Bozeman, Montana, founded February 11, 1927.

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University of Southern California, Los Angeles, California, founded May 17, 1930.

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University of South Dakota, Vermillion, South Dakota, founded May 15, 1928, (Inactive).

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University of Pittsburgh, Pittsburgh, Pennsylvania, founded March 23, 1929.

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College of William and Mary, Williamsburg, Virginia, founded April 19, 1930.

ALPHA ETA

Oklahoma Agricultural and Mining College, Stillwater, Oklahoma, founded March 13, 1930.

ALPHA THETA

State College of Washington, Pullman, Washington, founded May, 1930.

ALPHA IOTA

Bucknell University, Lewisburg, Pennsylvania, founded January 9, 1932.

ALPHA KAPPA

Hunter College, New York City, founded January 8, 1932.

ALPHA LAMBDA

University of Utah, Salt Lake City, Utah, founded February 13, 1932.

ALPHA MU

University and State Agricultural College of Oregon, Eugene-Corvallis, Oregon, founded November 18, 1933.

ALPHA NU

University of New Mexico, Albuquerque, New Mexico, founded April 21, 1935.

ALPHA XI

Rhode Island State College, Kingston, Rhode Island, founded May 17, 1935.

THE DECADENCE OF THE MALE IN THE ANIMAL KINGDOM *

DR. DAVID CAUSEY
University of Arkansas

IT is with much hesitancy and uncertainty that I address you on this occasion. I feel much like the Ancient Mariner when he delayed the wedding guest. At a time of mutual good fellowship, spiced by that inward joy which comes from communing with one's fellow beings, a somber note seems ill advised and jarringly out of place. There is, however, that inner voice which forces one to deliver his message and to take the consequences, though he be cast from your door and forced to join the wandering Jew in his weary pilgrimage.

These are indeed times which try men's souls. We seem to be entering the twilight of masculinity. No longer do we find those brawny heroes of old who, with mailed fist and two-handed sword, debated obtuse questions along the highways and byways of the world. There are no more crusades to the East to fight the mighty Saracens, no more quests in search of the Holy Grail, and the last of the dragons, the Dragon Lizard of Komodo, is to be seen in some of our zoological gardens. As I glance shudderingly backward over the last quarter century I see strange and startling innovations which threaten our social organization and cause me to fear to look into the future. As I look backward I see the invasion of the old time barber shop by a silken horde. Swept before it went those prerequisites of masculinity—the huge and shining loving cups of brass which graced the floor, the dear old Police Gazette with its anatomical studies on the covers. Gone! I see a piratical assumption of that dearest of masculine attire—pants. And such pants —conceived in the disordered brain of a maniac and brought into reality by a colorblind painter with a rainbow for a brush.

Consider the situation of today: a poor man might be delivered, as a wee babe of course, by a woman doctor; reared and educated by female preceptors and school teachers, be shaved by a lady-barber, have his teeth pulled by a feminine dentist, his clothes bought by his wife, his laws made by feminine legislators and argued in court by modern Portias, might work all his life for a captainess of industry; and at the end, after a lifetime of submission, be buried by a woman preacher. The

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* Address at the Phi Sigma Convention banquet, St. Louis, Dec. 31, 1935.

Maid of Orleans threatens to replace the Little Man on Horseback, and daily, as I pick my way about in my obscure corner, I fear to come upon the inevitable discovery that those swashbuckling pirates and buccaneers, Sir Henry Morgan and Sir Francis Drake, maybe even one-eyed and one-armed Lord Nelson, will turn out to have been women masquerading as men! Truly, as Kipling warned us in 1911, the female of the species is more deadly than the male.

Shall we turn from woman's inhumanity to man to the animal kingdom and there seek for consolation and surcease from sorrow? There, surely, we shall find the old time masculine supremacy unassailed. There we shall find such glorious beasts as the bull moose and his defiant bellow, the tough old ram of the mountain, the giant gorilla beating his hairy chest and roaring through the jungles, the king of beasts—the lion, himself. They exist, of course, but as we look deeper and deeper into the problem the more painfully obvious becomes the fact that throughout the animal kingdom the male is barely holding his own in favorable situations and in many definitely losing out. Mene, Mene Tekel Upharsin is the writing on the wall. Let us examine some of the facts which bear out this statement.

If I asked you to tell me what is peculiarly a female's duty in this world, I am assured that you would respond, "the care of the young." The male is the provider and the protector, but the female takes care of the young. A large percentage of our art glorifies the mother and her babe, and rightly so, even though we accept the theory that it's all a mere matter of endocrine response. Yet, among us we have foundling hospitals and doorstep babies. Do we find such in the animal kingdom? We do. Many reptiles and some bird mothers abandon their eggs to the tender mercies of the sun's rays and the heat of bacterial decomposition.

In many cases where actual parental care is bestowed upon the offspring, both sexes cooperate in the duties, but in many other cases the male has all of them thrust upon him. Perhaps most bird parents share the task of nest building, but in the case of the ostrich, the male has this task all by himself. True it is but a mere hole scooped out in the sand, but it's the best the poor old fellow can do. It is the principle involved which is serious. No doubt you have heard of the stickleback fish and the wonderful nest it makes. The poor male stickleback builds it all by himself, a marvelous little home of pieces of water weeds glued together with a glue his own little body provides. And when the little home is completed, does the female come gladly to lay her eggs and to brighten the little home with domestic touches? No. She has to be driven in by threats and force. She even refuses to lay sufficient eggs and the poor little man needs must find other wives until at last by polygamous endeavors he gets his little egg basket filled. Does any one of the reluctant mothers ever pause to offer him aid in the care of the young, even so little as a word of advice as to their diet? Not a single one. The tiny babies are left to the clumsy mercies of the father. I think that Matthew Arnold must have had the motherless stickleback babies in mind in his *The Forsaken Merman*, when he says:

"Children's voices should be dear
(Call once more) to a mother's ear;
Children's voices, wild with pain—
Surely she will come back again!"

but she never does.

The male stickleback is merely one of a long series of instances where the male is forced to take on all the parental care. Among birds are such examples as the Emu of crossword puzzle fame who sits alone for eight weary weeks while his wife goes in for whatever careering lady emus affect; the kiwi of New Zealand, the Tinamou, the Rhea and the Cassowary. Among lower vertebrates are similar instances. According to Norman the *Kurtus* fish of the Indo Pacific regions solves all her maternal instincts and duties by merely hanging her strings of eggs upon a bony hook which projects from her husband's forehead. From then on the care and feeding of children is his problem and his worry. Would that we could delve back into the tombs of the past and discover how those Delilahs of the long ago persuaded his forefathers to grow hooks on their foreheads!

The female seahorse, or sea mare I presume one would call her, plays the same trick in a slightly different way. She succeeds, by wiles and pretty tricks which I presume the feminine part of my audience thoroughly understand, in reducing the poor seahorse to a state of ecstatic anaesthesia and then deftly tucks the eggs into her husband's pocket. He is then abandoned to his parental troubles. What she does while the henpecked father nurses the children is not common knowledge. All the sea horse's relatives appear to be treated as ignominiously. Invertebrate companions in such disgrace are such far apart forms as the giant water bugs and the sea spiders or Pycnogonids. Hegner (p. 162) quotes Torre-Bueno with respect to the giant water bug as follows:

> "The female places herself on top of the male, her thorax extending outward and her legs hooked under him; now starting

> somewhere near the middle and sidling along every little while, she works her way around him as she fastens her eggs on his back by means of the water-proof glue secreted for that purpose. The male all the while hangs from the surface, back up, with his legs curled up under him, bravely bearing up under his burden.''

Many poor fish males have these nursemaid duties thrust upon them. Common examples about us are the bowfin, the bullhead and the black bass. Father away, but a companion in misfortune, is the lungfish. A number incubate the eggs in their mouths and for some time after the hatching offer a buccal retreat to the young fry when danger threatens. Guenther (p. 275) says:

> ''In the rivers of southern Brazil, there is a great Silurid or Catfish, locally known as the Bagre. The male fish takes the large eggs into his mouth (they measure as much as a twelfth on an inch in diameter), when the self-sacrificing creature is no longer able to eat; so that dead fish have often been found with their mouths full of dead fry.''

That the male may rise to sublime heights in carrying on this unfairly alloted task is shown by the male Lump-sucker.
Norman (p. 311-312) tells us:

> ''It is doubtful . . . whether there are better cases of parental devotion than that of the male Lumpsucker. For weeks and even months he devotes himself to the care of the eggs, fasting rather than leave his post, from time to time pressing his head into the clump of spawn to allow the water to penetrate to the centre, and thus ensuring the proper aeration of the eggs, a process which he further helps by blowing upon them with his mouth and fanning them with his pectoral fins. He removes any animals such as crabs, starfishes, and shell-fish which may crawl onto the spawn, and defends it with intense vigor against foes both large and small.''

That other groups of animals are similarly involved is evident. The Hellbender female leaves the male to guard the eggs, as does her cousin, the Giant Salamander of Japan. The Midwife or Obstetrical Toad of Germany must carry the egg-strings wrapped around his hind legs and according to Hegner (p. 304) hides:

> ''his 'shame' under a stone, or in a burrow in the ground, if it becomes too dry, he ventures forth after dark, as though

> not wishing to be seen in his humilating condition, and bathes the eggs in dew or in a pool of water. In about three weeks, when the eggs are ready to hatch, he enters the water. The tadpoles that emerge are in an advanced stage of development."

Then there is, According to Barbour (p. 87-88), the tiny cricket-like frog, *Rhinoderma darwini*, of southern Chili:

> "In this wonderful little creature the male takes the fertilized eggs and crams them down into his singing pouch, which in the breeding season becomes greatly enlarged, even spreading over the belly, and herein they transform, to hop forth later from their father's mouth as fully developed froglets."

In the Seyclelles Islands of the Indian Ocean the poor father must, when a pool dries up, see to it that the young tadpoles are carried to fresh scenes, strangely reminiscent of a human father taking the baby out for an airing. One wonders what, in all these cases, the females are doing while all this goes on. Your guess is as good as mine.

I trust that these scattered examples will suffice to illustrate my first point that in so many cases the female avoids her natural duties and thrusts them upon her mate who becomes a mere nursemaid. You may not agree that this is decadence—no doubt some of you because of sexual bias or inexperience will indignantly deny it. To those of wider experience I humbly submit that many a man's downfall began when a fair maid tied an apron around him and led him to the dishpan in the kitchen sink.

There are other lines of evidence of the decadence of the male which we much hasten to consider. One such is the relative size of the female and the male. Offhand one is prone to think of the relatively greater size of the male which is evident among the mammals. This is too obvious to be denied. But the age of mammals is passing, they are not holding their own, man himself being busily engaged in hurrying his own destruction, and it seems to me that little significance can attach to evidence from so decadent a group. The phenomenon of greater male size fails to hold throughout the animal kingdom. There are, indeed, startling exceptions.

Among the termites the sexes appear to get a fair and even start. They pair off after the swarming flight and start new societies where fate and chance permit. Then, slowly but surely, the male loses ground and becomes dwarfed into relative insignificance. We have a specimen of an African termite queen over four inches in length and with an abdomen as ponderous as that of the proverbal alderman. Her consort, poor wretch, is a miserable little fellow not three-quarters of an inch in length. In life he hovered tremblingly beneath that Gargantuan belly. Hegner states that in the silk spiders the female is always larger than the male and tells of a tropical spider species in which the female is two inches in length and the male a mere tenth of an inch in length. Other cases come to mind. The Argonaut or Paper Nautilus is much smaller than his mate. Does his lovely spouse take pity upon his smaller size and shelless state? She does not. In their amatory dealings he is lucky to escape with merely losing an arm! In this respect Darwin's barnacles who kept their several little husbands in pockets in their shells were a bit more thoughtful. The guinea worms, those fiery serpents which scourged the Israelites on the shores of the Red Sea and by a parasitological theology brought them back into the narrow path offer us a startling example. The female worm may extend from two and a half to four feet in length. And the male? A miserable Lilliputian, from an inch to an inch and a half in length. Other examples of this disproportion in size will appear in another connection.

We come now to a type of decadence which I hesitate to even present to you. Surely decadence can be no more ignominious and contemptible than in those instances where the male has become a degenerate parasite upon the female. We have a doubtful case in the gapeworm of birds. The male is small in comparison to the female and might well have been cited as another example of the disproportion in size between the two sexes. Once its youthful period of adolescence is over, it falls under the influence of some designing female and lives from then on, permanently attached to its paramour. There can be little doubt about the following: Chandler (p. 297) says:

> "Another related worm is *Trichosomoides*, found in the urinary bladder of rats; it is worthy of note because of the very inferior status of the males, which live permanently in the vagina or uterus of the females."

Is not Dr. Chandler's gentle dismissal of this degrading status a delicate touch? Much the same story may be told of the marine worm, *Bonellia*. The female worm may be a yard in length while the male is a mere 1 to 3 mm. in length and lives, with a number of fellow degenerates in the female's intestine and uterus, forming what I tentatively designate as an internal male harem. Many of the parasitic copepods have dwarf males living parasitically upon the females, and the same is true of the parasitic isopods. It would appear that when the female degenerates she drags the male down with her.

In the depths of the ocean occurs a shameful example of this melancholy condition of male parasitism. There the Ceratiods, black sirens of the deep, prowl around and lure by means of dangling headlights, unsuspecting little fish into the reach of their cruel mouths. Attached to them in a most literal sense are the males, attached to any part of the female's body, and attached for life. Lacking mouths, jaws, teeth, fins, lacking almost all save the reproductive organs, they hang there, mute victims of Mother Nature's jesting. The female fish may be more than three feet in length, the males a scant four inches!

I want to ask you, what may the tiny male Ceratiods think as they ride upon their female masters through the inky depths of the ocean? Browning sang:

> "The year's at the spring,
> And day's at the morn;
> Morning's at seven:
> The hillside's dew-pearled;
> The lark's on the wing;
> The snail's on the thorn;
> God's in his heaven—
> All's right with the world."

but I wonder what those little parasitic males would sing? What a biological joke they are!

I trust that these random examples of what is happening in the animal kingdom will suggest that the male is being gradually lessened in importance. The tale is yet to run. He is gradually being eliminated from the animal kingdom. And does the female regret his going? In many cases the attitude of the female is as brazenly open as one could possibly imagine. Let us consider some of these cases, examples where once the male's services have been obtained he is cast aside. You will recall the circumstances in the case of the honey bee. The day arrives when the young queen is to mate. Amid great excitement, she leaves the hive and mounts high into the air, followed by an excited group of drones. Far above all things mundane the mate is chosen and the essential act consummated. That done, the drone falls back to earth, unsexed and dying. Does the fair bride pause to comfort his last moments, or to betray the slightest emotion upon becoming a widow as she became a bride? She does not. The poor, fatherless drone gets not a single glance. She merely goes home. His body is left to the tender mercies of those insect ghouls, the ants. We must not forget the left over drones, those who also ran but won no victory in the pretty aerial race. As the season advances their barren sisters rise up in sexual wrath and either destroy them or cast them out to freeze.

Fabre has given us several accounts of even worse cases. Possibly you recall the mating promenade of the scorpions, how coy and passive the female is as the male clasps her claw-like hands and leads her about in a weird dance. At the conclusion of the dance they retire to some secluded spot, a hole in the ground or under a stone. Some time later the female alone comes out. I wonder if Dante had watched this dance of death in sunny Italy and if it was seeing the pair go into their burrow that suggested to him that inscription he said was written over the gate of Hell: "All hope abandon, ye who enter here."

It is obvious that the Praying Mantis shocked Fabre. I quote his account of the courtship (p. 82):

> "We are near the end of August. The male Mantis, a slender and elegant lover, judges the time to be propitious. He makes eyes at his powerful companion; he turns his head toward her; he bows his neck and raises his thorax. His little pointed face almost seems to wear an expression. For a long time he stands thus motionless, in contemplation of the desired one. The latter, as though indifferent, does not stir. Yet the lover has seized upon a sign of consent: a sign of which I do not know the secret. He approaches: suddenly he erects his wings, which are shaken with a convulsive tremor.
>
> "This is his declaration. He throws himself timidly on the back of his corpulent companion; he clings to her desperately, and steadies himself. The prelude to the embrace is generally lengthy, and the embrace will sometimes last for five or six hours.
>
> "Nothing worthy of notice occurs during this time. Finally, the two separate, but they are soon to be made one flesh in a much more intimate fashion. If the poor lover is loved by his mistress as the giver of fertility, she also loves him as the choicest of game. During the day, or at the latest on the morrow, he is seized by his companion, who first gnaws through the back of his neck, according to use and wont, and then methodically devours him, mouthful by mouthful, leaving only the wings . . ."

He watched one female thus serve seven successive husbands in the course of two weeks. Even Hollywood seems to have been anticipated by the insects! And at another time he says (p. 84):

> "I once surprised a male, apparently in the performance of his vital functions, holding the female tightly embraced—but he had no head, no neck, scarcely any thorax! The female, her head turned over her shoulder, was peacefully browsing on the remains of her lover!"

No wonder Fabre was shocked. We need not, however, look to France for such horrors; our Black Widow is a self made widow; she eats her mate. In these cases where the male is still essential, it appears that he is tolerated up to the point where he has fulfilled his primary purpose, and then, like the Queen of Hearts which little Alice met underground, it's "off with their heads."

The male need not be eaten, he may be dispensed with by various means. In a number of kinds of animals the steps toward the elimination of the males are clearly evident. Hermaphroditism occurs in a wide range of animals. Our freshwater *Hydras,* our various flatworms, some nematodes, most of our snails, and the common earthworms come to mind as examples. It is less common among the protozoa where such forms as *Paramoecium* and *Volvox* may be so interpreted. Borradaile has suggested that it has arisen from animal types where the sexes are separate. If we accept this fascinating theory, may we not extend it to mean that it is merely a cunning device whereby the male is made unnecessary and so eliminated? May not the hermaphroditic animal be interpreted as a female upon whom the male was originally parasitic, a male who by successive steps of parasitism has become so degenerate as to be represented by merely his sex organs so incorporated in the female's body as to appear an integral part of her? This is merely a suggestion, I do not insist upon it.

In passing, let me refer incidentally to polyembryony, that curious condition where one egg produces two or more individuals. Is it not, when all is said and done, a cleverly successful device for lessening the importance of the male? It occurs through a wide range in the animal kingdom. Experimentally it has been achieved in such forms as *Amphioxus,* in various echinoderms, in amphibians, and in fish. It occurs naturally in certain worms, in many of the parasitic hymenoptera, and in such mammals as the armadillo and man. Recent reports from Canada would suggest that polyembryony in man is undergoing a rapid evolution. Apropos to this is an interesting fact. Has it ever occurred to you that when a woman gives birth to identical twins, they are not her children? The original ovum reproduced asexually, and the resulting twins are her grandchildren. I am glad that lack of time prevents any such analysis of the famous quintuplets' relationship to their reputed parents.

Parthenogenesis is clearly a device for the elimination of the male. It occurs in such varied types of animals as the branchiopods, astracods, and other crustaceans; hymenoptera and other insects; rotifers; nematodes; even among the protozoa. It is said that parthenogenesis is a method adopted in cases where a rapid multiplication of the species is desirable for the continuance of the race. The aphids which spread over your roses are an example of this rapid increase. The same may be said for aquatic animals such as the rotifers and the water fleas. Granted, but who adopts this method? A female. And has it occurred to you what is the typical result of this parthenogenesis? Females and more females, endless hordes which sweep down through the respective environments as the Huns of old swept into Europe. Only when conditions become unfavorable do they resort to the support of the males, which among the aphids occurs when the summer wanes and winter with its frosts and freezes approaches. And these males appear merely to serve their little parts, sexual minute men leaping to the call. The female aphids have not yet quite succeeded in doing without them. Among the Cladocera Banta (p. 60) has shown that:

> "parthenogenetic reproduction may be continued for hundreds of generations, and presumably indefinitely, without the intervention of sexual reproduction,"

and that males will appear when the females are crowded together in a limited environment. They are nearly independent of the males.

The Rotifers would appear to suggest the end of this tendency. Male rotifers are commonly small and degenerate, "the race," according to Jennings (p. 580), being represented mainly by females." In a number of species the males appear not rarely but never so far as the observations of many investigators go. And this is probably the end of the story, the decadence of the male is then complete.

Are there any exceptions to this melancholy story, any bright rays of hope for the male? I have found little to suggest such. Occasionally groups of males are found alone. Male ascarids may inhabit a human intestine and live their little lives with no feminine influences to mar the perfect harmony. The young male seals herd together in their happy period of adolescence. Occasionally a bee queen is unable to lay fertile eggs and accordingly builds up a lusty hive of males. I regret to say that in all of these cases the associations are not permanent or complete successes. I know of only two cases where no decadence is evident. One such is that of the fur seal of which one reads such statistics as harems which average from seventy to eighty in number, harems in which the females know their places and meekly accept them. The other is among the cowbirds where the males outnumber the females considerably. A possible last example is the Cicada. Hegner (p. 172) quotes Xenarchos as saying:

> "Happy is Cicada, since his wife has no voice."

The conclusions of this jeremiad are obvious. Any freshman botanist or zoologist can tell you that sexual reproduction was an after thought in the biological world. With sexual reproduction came a great burst of evolutionary change. Perhaps merely incidental, but following it came the separate sexes, male and female. For a long time, we may assume, they shared their duties and obligations equally—while the male may not have been necessarily the head of the house, he was a least a respected and useful member. But times change and needs change. In many groups the male is in an evident decline, both morphologically and physiologically. In some groups he can obviously be dispensed with for long intervals, perhaps entirely. In still other groups he appears to have been absorbed, stripped of all save his sex organs and incorporated as part and parcel of the female's body.

The Vikings of old looked forward to the Twlight of the Gods when wise Odin and mighty Thor, even mischievous Loki and lovely Freya should be no more—a gloomy vista of the future. It came, and the sons of the Vikings no longer look forward to the coming of the Valkyrie to take them to Valhalla and its heroes. Shall we, as we try to peer into the unopened corridors of time, look forward to the twilight of the male, a time when the female, more deadly than the male, shall have done with him? Or will the Amazons of the future prove to be as fabulous as those of the past? I ask questions for which I have no answers. But I wonder, in those days of long ahead, will your daughters and my daughters some day point with amusement, in some great museum of the future, to the beautifully preserved specimen of the last man, standing alongside the Great Auk and the dodo? I wonder.

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IT SEEMS THERE WERE TWO IRISHMEN

Murphy arrived home unsteady as the New Deal and decorated for valor with a large black eye.

Mrs. Murphy took one look at him, grunted: ''Drunk an' fightin' again, is it! An who were yez fightin' with?''

''Casey''.

''An ya' let Casey give ya' that shiner?''

''I did''.

''What did he have in his hand?''

''A shovel it was.''

''An what did ya' have in yer hand?''

''Mrs. Casey's leg, but it wasn't much good against a shovel''.

—*Town Crier.*

BUCKNELL'S TYPICAL COUPLE

WILLIAM CLEMENS, '37, *Alpha Iota*

LET us consider the typical Bucknell couple, if there is such a thing. They are both strong and healthy individuals with straight and symmetrical bodies. Let us call them Tom and Mary. Tom has his 154 pounds distributed over a 69 inch height. Mary is only 64.3 inches tall, and her slight 123 pounds is nothing for Tom to lift across muddy gutters. If and when they embrace, Tom has 36 inches of good, barrel-like chest to be encircled, while Mary is not far behind with 33.75 inches. Tom's normal pulse is 75 and his bloodpressure 110. Mary's pulse is 78; her bloodpressure, 105. These values are valid only when they aren't together.

Both have abundant, dry, but glossy hair which is tough and uniform in length. The pupils of their eyes are always the same size. Mary's eyes aren't sensitive to bright light, while Tom's are slightly so. Of course, it may be the light in Mary's eyes to which he is sensitive. Mary wears glasses six hours per day, while Tom needs them only five hours.

When Mary smiles at Tom, her red lips—for they are red even under the lipstick—part to disclose gleaming white teeth with smooth enamel and promptly-filled cavities. But when she yawns at some of Tom's poor jokes, those same lips part to show a pink, moist tongue and a broad and smoothly arched palate. Mary sees the same thing when Tom smiles, but he doesn't yawn. The cavities might be more evident with the yawn. Both have two teeth missing. A peep into their respective medicine-cabinets would probably disclose Ipana toothpaste and Listerine, for neither have ''pink toothbrush'' or halitosis.

Tom and Mary both have a tonsil, and a little over half of their adenoids removed. Both have free movement of the head, Mary especially, for she can nod in any direction.

Our couple has smooth, soft skin, firm and elastic, and free from marks or discolorations; they both perspire rather freely. Mary's skin is pink and even, while Tom's is tanned and shows a slight acne.

Tom's shoulders are very square, especially when he thinks Mary is watching him, while hers are only slightly so. When they hold hands Mary distinctly gets the worse of the bargain, for Tom's grip of 70 Kilograms is twice as great as Mary's which is 34.5 Kilograms. Their hands are symmetrical, with digits all present, and nails firm and pink, even sans nail polish. When they are dancing to the music of the Bucknellians, or who have you, they are foot-loose and carefree, untroubled by such things as weak ankles, painful feet, fallen arches, corns, callouses, or "athlete's foot."

Tom falls down in maintaining the male supremacy by allowing Mary's 7.5 cms, of chest expansion to exceed his 7 cms. But Tom proves more chesty than Mary by having a vital capacity of 4.46 liters, as compared to Mary's 3.11. Going farther down we find that Tom's stomach girth is 31 inches; Mary's 30.

They both acquire skills easily, so that they have in all probabilities proven their dexterity at Monopoly. Mary says that she fatigues quicker than Tom, but whether she was referring to dancing or Monopoly we don't know. Both have normal senses of taste, smell, and touch; their speech is unimpeded.

Our couple's minds are given to moods occasionally, but whose aren't? They are both slightly absent-minded, probably when they should remember to do some unpleasant assignment. They have a zest for both work and recreation, are wholesomely tired at bedtime, go to sleep promptly, sleep so roundly, and awake the next morning refreshed by the night's sleep in their respective quiet, well-ventilated rooms.

Tom and Mary's appetites are so good that they are inclined to overeat, stopping only when they are appeased. Their elimination is as it should be. Both eat three meals a day, Mary at the Women's College Dining Hall, and Tom at his fraternity house. Tom either eats more food, or more slowly, for he spends three minutes more than Mary's 25 minutes for lunch; and exceeds her 31 minutes for dinner by a 37 minute repast. Both spend about 15 minutes for breakfast. Tom and Mary eat between meals, with candy as their chief delicacy. They also eat milk, greens, and fresh fruit daily. Mary drinks slightly more water than Tom, although both imbibe around five glasses a day. But Tom likes his coffee better than his friend, for he has nearly two cups a day, while Mary has only a little over one cup. Tom may have some English blood in him for he has 1 1-2 cups of tea daily, while Mary does good if she has one.

Both live in a large family group at home, but here at college Mary lives alone, while Tom has a room-mate in quiet and congenial living conditions. Mary spends about 4.5 hours daily by herself, and 9.75 hours mingling with others—her class-mates, sorority sisters, and, perhaps, Tom. At least not all of this time is spent with Tom, for he has only nine hours daily to use in mingling with others, and five hours to himself. Neither has any special time for retiring, although they generally get to bed by midnight. When they are feeling especially hygienic they might even retire by 10:30 or 11:00. Mary usually gets up between 7:00 and 7:30; Tom does at times, but its awfully hard, and occasionally he doesn't roll out until five minutes before class. And if he is lucky, this is 8:55.

Tom and Mary both work indoors, and both state that they generally sit while at work. Perhaps this accounts for the worn condition of some sofas and chairs. Strangely enough or otherwise, they signify that their work is satisfying. Mary works 7.5 hours daily for over six days a week; Tom works seven hours a day, but less than six days a week.

Both Tom and Mary are firm believers in the values of exercise, for they each spend 1.5 hours daily, with something over nine hours as the total time given weekly to exercise. Evidently they might enjoy some of their exercises together, for they both favor swimming, hiking, tennis, and dancing.

Mary finds only 5.5 hours weekly to spend on her hobby, while Tom devotes seven hours to his. Their interests are both centered around sports, reading, and music. Tom spends nearly six hours a week in dancing and conversation, while Mary has seven hours to give to these same social recreations. Both find some time to read current events and literature which affects their emotions. Mary spends four hours thus, weekly; Tom gives 5.75 hours per week. Societies and club affiliations take up 8.25 hours per week of Tom's time, while Mary spends only 2.5 hours so. But with all these forms of exercise, hobbies, club affiliations, reading, lessons, etc., both find one day for rest weekly.

Tom and Mary have few, if any, bad habits. They are not addicted to strong drinks or soft drinks, although they do occasionaly have a ''coke''. Neither smokes habitually, although Mary may indulge two days a week; and Tom, three or four. They visit the dentist annually, and have a health examination yearly. They were vaccinated against smallpox about 10 years ago, and have received toxin antitoxin for diphtheria. Both are reluctant to take medicine without a physician's advice, although Tom is slightly disposed to apply home remedies.

I have tried to present a composite picture of a typical Bucknell couple, basing it on figures and data gathered in the last two years. I have every reason to believe that this picture is as true now as it was then.

REPORT OF THE NATIONAL SECRETARY

December 30, 1935

DR. A. I. ORTENBURGER, *Secretary*

TO the delegates representing the several chapters of Phi Sigma:

This report covers the interval since my last report which was given June 26, 1933, before the convention assembled at Chicago.

It is very gratifying to me to be able to give an eminently satisfactory report to you concerning the general welfare of Phi Sigma. In 1933 when my last report was given I was inclined to be just a bit pessimistic concerning the future of our Society—owing *not* to internal difficulties I am proud to say,—but to external influences, the indirect effects of our late depression. Financial matters were of serious concern to the chapters; some members elected, often the best of a group, were unable to accept the honor because of actual lack of the necessary funds. This happened in many cases known to me personally. It looked as if the situation might very well become worse rather than better but we went ahead hoping for the best. The National treasury was confronted with similar financial difficulties, because as the chapters prosper, so does the national organization; but by careful trimming of expenses, even to the use of post cards wherever possible instead of 3¢ stamps, we have come through and in spite of it all are in better shape today than ever before.

Since June 1933, three new chapters have been added to our now impressive roll. Alpha Mu Chapter was installed at Corvallis, Oregon, November 18, 1933, by the National Vice Chancellor, Doctor Hatch; Alpha Nu at the University of New Mexico was installed April 21, 1935 at Albuquerque, New Mexico by your National Secretary, and Alpha Xi was installed at Rhode Island State College, Kingston, Rhode Island, May 17, 1935 by your National Chancellor, Doctor Warren.

The installation of these three new chapters encourages the National council, as it indicates steady, continued growth. And once again I am glad to report that I am corresponding with several institutions concerning petitions for a charter.

It is clear to me that if we can thus, during these past few *trying* years hold our position of interest and importance in the biological world, we can expect greater growth in the future. Do not be misled, however, as I do not wish to give the impression that mere numbers mean everything. It is obviously better to have fewer good chapters and to have fewer good members in any chapter than to have a large number of chapters or members without due regard to quality. We have not allowed our standards to be lowered. Our growth could be shown by a curve indicating our total membership by years. It would show a real drop during the past two years 1932-34 and then it would again begin its upward swing during the past school year 1934-35; I may say further that there is every indication this year (as shown by incomplete records) of the continuance of this increase.

During the 1932-33 period there was a drop of only about 15% ; this really is a record to be proud of in the sense that the drop was so small. Today, then, we are on the upgrade again. I have prepared for my own information a chart showing the numerical data for all chapters for all years. This table gives much interesting information at a glance and anyone may examine it who wishes.

	'15-16	'16-17	'17-18	'18-19	'19-20	'20-21	'21-22	'22-23	'23-24	'24-25	'25-26	'26-27	'27-28	'28-29	'29-30	'30-31	'31-32	'32-33	'33-34	'34-35	Total
No. chpts. initiating	2	2	5	4	3	8	10	12	13	15	20	20	24	26	29	29	31	30	30	32	
ALPHA	40	3	7	4		1	13	2													70
BETA	14	26	30	24	33	26	17	35	25	28	18	20	21	18	32	41	32	28	40	27	535
GAMMA																					0
DELTA			22				2	27	29	8	27	21	23	29	24	22	19	12	16		281
EPSILON			20	1	8		7	6	5	7	7	13	9	14	20	9	16	4	18	10	174
ZETA			26	3	29	15	18	12	28	44	28	49	41	37	41	50	44	25	14	22	526
ETA						21	7	12	8	4	8	12	7	10	12	6	9	6	9	5	136
THETA						19	11	18	16	17	3	36	22	60	18	26	31	17	14	11	289
IOTA						13	18	20	15	27	22	6	24	61	4	24	10	25	17	17	303
KAPPA						54	17	24	31	19	34	23	31	28	21	52	26	31	18	19	428
LAMBDA						17	10	19	20	19	28	20	19	10	9	24	13	10	16	17	251
MU								126	83	43	45	38	81	51	54	39	46	47	50	50	753
NU								43	5	8	9	12	11	13	9	7	8	7	10	6	148
XI									41	28	19	19	17	21	35	29	16	8		10	243
OMICRON									20	9	12	9	5								55
PI										18	4	10	8	23	10	8	10	5	8		104
RHO										30	22	33	21	22	19	30	24	11	10	24	246
SIGMA											19	20	15	21	15	21	5			16	132
TAU											21	13	11	21	13	11	16	13	6	14	139
UPSILON											38	14	17	13	28	23	24	32	20	48	257
PHI											55	14	29	19	17	17	28	30	23	28	260
CHI											22	10		6	8	6	10	13	9	9	93
PSI													47	29	22	47	45	45	22	23	280
OMEGA													22	20	12	15	18	23	20	23	153
A. ALPHA													40	29	16	17	19	16	18	17	172
A. BETA													34	7	15	20	30	24	17	30	177
A. GAMMA													24	10	14	15					63
A. DELTA														15	11	8	8	11	4	6	61
A. EPSILON														50	27	22	11	8	11	13	142
A. ZETA															33	21	17	17	13	13	114
A. ETA															48	49	16	26	21	7	167
A. THETA															42	18	37	21	15	17	150
A. IOTA																	35	16	5	10	66
A. KAPPA																	49	10	14	11	84
A. LAMBDA																	24	10	15	27	76
A. MU																			76	22	98
A. NU																				32	32
A. XI																				65	65
	54	29	105	32	70	166	120	344	326	309	451	392	579	597	629	677	694	551	549	649	7323

Briefly, in 1929-30 we initiated 619 new members of all classes.
in 1930-31 677 new members of all classes.
1931-32 694 new members of all classes.
1932-33 a drop to 551 new members of all classes.
1933-34 549 new members of all classes.
1934-35 increase to 649 new members of all classes.

Some of the following matters may be of national interest:

Another newly-revised edition of the constitution has been issued, the 10th, which includes all changes through those made at the Chicago Convention. The eleventh edition will be printed shortly following this convention, not because I expect many changes, but because we have about exhausted our supply. Our constitution should not be looked upon as unchangeable, but basically I am sure that it is sensible, useful and a good guide. It has stood the test of time.

Since the last convention we have been using the new style certificates which we all feel is a real improvement. These new ones, with the standard lettering (all executed by the same artist) give all new initiates a mark of recognition which they are proud to display.

In 1930 I gave as part of my report a summary of the many functions of my office but I will not bore you with this at this time. If, however, any of you wonder what your National Secretary does in his spare time, I will be glad to give you a copy of this list for your consideration. I am glad to say that my office has been able since 1933 to carry on all of the necessary duties as effectively and as promptly as formerly and at a still further reduced budget. Certain expenses, however, are not capable of reduction without loss of effectiveness and these therefore have not been reduced. Office supplies, stamps, stenographic help and so on are essential. Well over a hundred letters must be written each month; incidentally most letters received are answered the day received. Supplies requested are also sent, almost without exception, the same half day that your letter is received. Every effort is made to help chapters in any way possible and promptness is just one way. Most delays are due to the failure of chapters to send in names *with* addresses promptly at the beginning of each school year, and also the failure to give notice promptly of change of officers during the school year. During the summer when my mail must be forwarded, there is necessarily some delay. You know it's a funny thing—it seems perfectly all right for a chapter to fail to answer my letter or even the third or fourth letter, but should I neglect a chapter letter just two or three days. that is beyond understanding. This reminds me of a point which I think chapters generally miss—the assumption is apparently made by some that your national officers have the business of Phi Sigma as their only occupation. This is in no case true—Your National Chancellor is Professor of Botany at Tufts College, Doctor Hatch is Associate Professor of Zoology at the University of Washington, your Editor as Rector of St. Norberts College has all of the administrative work accruing to this position as well as teaching to do. Your Treasurer in his work in Colorado has the immense job of overseeing many square miles of land, while I have only three positions to fill in addition to my work on your behalf, that of Professor of Zoology, Curator of Vertebrates in the Museum of Zoology and Vert. Zool. of the Okla. Biol. Survey. I mention these facts so that you may take back to your chapters the idea that we all have the real interest of Phi Sigma at heart. We would not take our time to serve you if we did not feel that the society was doing something very worthwhile in "promoting interest in biological research". But enough of that.

In the National secretary's office we now have three large steel files filled with records of all chapters from 1915 to date. These records are arranged both alphabetically by members and also chronologically by chapters so that any single name may be found literally in less than 30 seconds. It was our hope at the time of the 1933 convention to be able to issue another directory, but owing to the unreasonably large expense it was decided to postpone publication for a few years.

The Biologist continues to improve and flourish, but it has remained impossible (financially) to publish it quarterly as was once done. This fine work has been carried on since February 1931 by Doctor Keefe who at that time relieved me of the big job of editing our journal, (this in addition to the work of the Secretary's office was too much for me). With the addition of worthwhile articles by well known biologists, by changes in the format, by the addition of new departments, we now have a society publication which is more than merely that—it is achieving a real standing scientifically.

A change made by the National Council at the last meeting in Denver has helped materially in keeping the official national records straight. For the past year and a half this office has issued no certificates of membership until the necessary fees for the initiate in question have passed through my office. In this way we have eliminated the former difficulty which existed for years of payment of fees to one office and issuance of certificates from another never knowing how *many* initiates' fees had been received *or which* some time later. Our records now agree and this has been a real step in advance.

Perhaps the most significant matter to be reported upon is the growth of our Scientific Program. In 1928, our scientific sessions began with a total of four papers a small but worthwhile beginning. In 1930 at our Cleveland Convention, a real program of some 27 papers was given. In 1932, at Atlantic City, a scientific program was given but no convention was held. In Chicago, in June 1933, with temperatures up to 102 degrees, a program of 70 papers was presented. This year a material growth is *again* shown with a fine total of 90 papers. Once more mere number of titles means little, but if anyone takes the trouble to compare our papers with those of other organizations associated with the A.A.A.S., he will find that Phi Sigma can well take its place alongside the older societies composed of more mature members.

In conclusion may I ask that as assembled delegates you consider matters which will be brought before this convention in a sane, logical, unbiased and unhurried manner. That you do not allow the oratory of any delegate to influence you too much but that you consider each point as it arises on what seems to *you* its basic, fundamental features; always keeping in mind that first must come the general good of the Society—in a *national* way—not local.

Remember that our Society has grown and developed to its present respected status by steady, *slow* growth resulting from *conservative* policies with small changes as they became necessary but without much deviation from its original methods and purposes. The tendency today in all kinds of organizations and in politics is to make sudden, mostly unconsidered and unpremeditated changes on the mistaken assumption that anything that may be done or which may happen will of necessity be better than what has existed. Such an attitude is unwise, indefensible and usually deplorable in addition to being foolish and unscientific. Think carefully and consider important matters with good sense; avoid drastic changes because in all probability before much time will have passed we will see that they were really unnecessary.

Now with this general advice, probably unwelcome because it was not asked for, I conclude what may be considered as "preaching". I gave it however, please believe me, because I have the good of our Society at heart. If your national officers did not honestly believe in the real worth of Phi Sigma, if we were not absolutely sure that it was doing a great service to the younger scientists, if we did not feel certain of its purposes—not one of us would give our time and effort in serving you. It is because we *know* that Phi Sigma is furthering and fostering a good cause that we are here with you, asking that you do not forget that all that we do or suggest is, in our opinion, for the welfare of our Society, Phi Sigma, of which we are all so proud.

Statement by the National Treasurer

The convention fund of the Society is about holding its own and with luck we will be able to hold our meetings when we should.

The Biologist fund will be able to meet the cost of the next two issues of the Biologist if ordinary issues only are printed.

There is a sizable deficit in the General Fund but as soon as the legislation passed at the last convention goes into effect we hope to be able to clean it up.

The Endowment fund is not growing as we would like as we have been obliged to apply the key royalty to the General fund in order to hold down the deficit in that fund but beginning next December we hope to be able to return the key royalty to the endowment fund.

Any chapter wishing further data about the Society finances may obtain the same by writing directly to the National Treasurer.

THE SPIRIT OF SERVICE

Recent news item that the Soviet government has thought up penalties for malingering Russian workmen has reminded an engineer (who writes us) of a letter he received not so long ago from a colleague in Russia. This colleague, also an engineer, wished to convey the news to his friend in America that work on the construction of the Dnieprostroy power station had been seriously handicapped through the lack of cooperation on the part of the Mongol tribesmen. To get this bald statement of affairs in Russia past the Soviet censorship was impossible, because everything is cooperation over there. The engineer managed, however, to get his idea across. He wrote his friend thus: "I have found no evidence whatever of forced labor. On the contrary, the natives have been willing to cooperate on the project with the same spirit in which the American Indian aided in the colonization of the West." The censors were apparently pleased at this comparison and sped the message on its way.—*The Highway Magazine.*

CONVENTION MINUTES
ST. LOUIS, MO.

Called to order 9:30 Monday December 30, 1935.

Committee Credentials appointed--Stewart, Wm. Clay, J. Van Sickle, S. J. Atwood.

Committee Credentials report

Report—Seated all registered so far.

Appointment further committees:

Committee on Nomination
Keefe—Chairman
M. Greene
W. B. Hart
J. W. Wilson
B. H. Grigsby
D. M. Hammond

Committee on Revision of Constitution
Ortenburger—Chairman
J. A. Barkley
G. C. Bond
E. A. Barclay
J. H. Bragg
S. Park

Committee on Resolutions
Hatch—Chairman
R. Turley
I. Goslin
L. Roth
P. Wright
H. Exline

Auditing Committee
Stewart—Chairman
F. Park
T. S. Clare
A. Johnson
H. B. Fletcher
K. Herrold

Brief Reports from delegates already seated.

(time) 10:17 Brief reports from delegates completed.

10:27 Report of Editor

10:47 Report of Secretary

11:00 Report of Treasurer

Announcements by Warren.

Any old business—None.

11:10 New Business.

Epsilon—Question relative to size of chapter because requirements high?

Discussion: Alpha Kappa, Alpha Lambda, Psi, Alpha Mu, Keefe.

Twenty-four chapter delegates present.

Thirteen required grade requirement.

Six chapter grade *and* research requirement.

Thirteen research requirement.

Eleven require grade *and* research requirement *plus* faculty recommendation before being considered.

Discussion: Alpha Iota, Alpha Alpha, Sigma.

11:30 Sixteen have local By-Laws requiring one or more of above requirements.

Iota Motion—Ask permisson to elect *students* from other institutions; (St. Louis College of Pharmacy, St. Louis Univ., Harris Teachers College).

Art. IV, Section 2—Chairman rules does not apply to other institutions.

Iota withdraws motion.

Alpha Kappa discussion:—Take members from Columbia?

Epsilon—Distance between "local" colleges make a difference. 10 miles radius in St. Louis, 75 miles Columbia because couldn't attend meetings.

Alpha Kappa—Most members graduate and doing research at N.Y.U., and Columbia *not* at Hunter. Thinks would be a good thing.

Hatch—

Stewart—St. Louis situation local and different.

Chi—Leave to local chapters.

Sigma—Leave to National Council after chapter decides individual cases.

Kappa—Request from individual from Arizona—not done.

Alpha Epsilon: Several in Pittsburgh—require that they be doing research in Pittsburgh.

Epsilon—In case of Hunter, looks as if chapter is in wrong school

Alpha Lambda—Two problems: 1 schools Colorado too far apart
2 In case Hunter—close enough

Iota—Might lead to nucleus for new chapters in other schools.

Keefe—Keep organization plastic.

Alpha Kappa—Should they be allowed to initiate as members, people not graduates of Hunter College.

Alpha Mu—Situation in Organization.

12:00 Keefe—Question.

Warren—Information in regard to scientific program.

12:05 Adjourned.

Meeting called to order 9:10, Tuesday morning, December 31

Report of committee on Constitution called for:

Report given by Ortenburger and considered as individual items as numbered below:

All changes recommended by unanimous vote of committee unless otherwise stated

1. Add to Art. II Section 2c that terms of National Secretary and National Treasurer expire July 1 following election of new officer. Effective immediately.
   Moved that it passed—Sigma, seconded it—Alpha Alpha. PASSED.
2. Change in the By-Laws Section 2 that the G.A.A. be $2 instead of $1.00.
   Moved that it pass, Alpha Kappa Second; discussion—Psi, Stewart.
   Alpha Theta (too much in Convention fund?), Sigma. PASSED.
3. Art. IV, Section 4 be interpreted to mean full time instructor or higher.
   Moved by Alpha Lambda, seconded Psi, PASSED.
4. That Art. II, number 4 under 2e be deleted.
   Moved by Zeta, seconded Alpha Iota. Discussion,—Psi (Publish in Mimeograph form?) Kappa, Keefe. PASSED.
5. That a charter member be defined as follows—"Both those whose names are on the petition and those who are members in good standing of the local group at the time

of installation shall be considered charter members.'' Alpha Nu moves, Phi seconded. PASSED.

6. That first line page 11 edition 10 Constitution read ''any active member and line 11 same section insert ''active'' before member. Alpha Lambda moves, Omega, seconds. PASSED.
7. Art. IV, Section 4, Faculty membership interpreted to include those of the rank of full-time instructor or above. Moved by Psi, seconded—Alpha Lambda. PASSED.
8. Art. III, Section 8, First sentence to be changed to read ''. . . $100 for the first 20 initiates and $5 for each additional charter member.'' Alpha Lambda moves, Alpha Nu seconded, discussion, Alpha Lambda, Sigma, Alpha Mu, Epsilon, Psi. PASSED.

9:40

9. Art. III, Section 7a first line page 8, Change president to *Chancellor.*

   Moved, Alpha Theta, Seconded, Alpha Kappa. PASSED
10. To eliminate Art. VIII, Section 3 and to replace it with the following: The initiation ceremony shall consist of the reading of the Ritual by the President in the presence of the candidates and the signing of the chapter roll. However, initiation shall not be considered complete until the initiation fee and completed membership blank have been received by the National Secretary. No initiate may vote or hold office until the initiation is complete.

    Alpha Nu moved, Alpha Lambda, seconded. PASSED.
11. (Vote of approval by committee 3 to 2)

    Art. IV, Section 6 line 10 change ''shall'' to ''may''. Line 12 same section add ''and if admitted''.

    Chi moves, Lambda, seconded, discussion. Kappa, Alpha Lambda, Alpha Kappa, Keefe. PASSED.
12. Art. VIII, Section 4—Add the following, ''Any candidate for membership properly certified by one chapter may be initiated as a member of the certifying chapter by any other chapter.

    Theta moves, Alpha Mu seconds, discussion. Alpha Theta, Alpha Mu. PASSED.
13. A member of this committee requested that the com-

mittee call to the attention of the convention that the use of the Ritual is mandatory.

14. Motion by Iota delegate reported "Iota requests permission to take in students as members of its chapter from the St. Louis College of Pharmacy, and St. Louis University, but that this matter be referred to the National Council and that all similar requests be handled in the same way".

    No record of action at this time.

Meeting open for recommendations from the floor re. Constitution.

Sigma—Question re definition of active membership.

Alpha Alpha—Question re Art. IV, Section 2.

Zeta—Question re Honorary membership.

Phi—Moves that Phi Sigma require a scholastic average. No second.

Sigma—Moves reconsideration of Art. IV, Section 6, seconded, discussion Zeta.

Zeta—Moves to amend the amendment to "active or inactive" line 1 seconded, Alpha Lambda. PASSED.

10:25 Sigma—Suggests insertion of "to have been in good standing". Questions by Alpha Lambda, Alpha Mu, Alpha Theta.

Iota—Point of order wishes action on Iota motion re other institutions in St. Louis. No action.

10:36 Report Committee on Credentials—All delegates present—Ordered seated.

Question by Stewart—What does Convention wish done about Fare Checks sent to chapters not represented?—Phi, Alpha Beta, Alpha Delta, Alpha Zeta, Alpha Eta, Alpha Xi.

Checks should revert to National Treasury.

Question by Stewart, but no action desired at this time. What about chapters who have not paid G.A.A.?

Alpha Lambda, moved court be accepted. Seconded Alpha Nu, —PASSED.

Lambda moved to transfer of refunds from fare checks (not used by absent delegates) to general fund. Seconded, Alpha Iota. Discussion—Zeta.

Alpha Lambda, Keefe, Stewart, Epsilon. Motion lost.

Report Committee on Resolutions read by Lambda delegate and it was ordered that the National Secretary send copies to all those concerned.

The committee wishes to report the following resolutions:

> "Whereas the A.A.A.S. has made a place for us on their program;
>
> "Whereas Mr. George T. Moore and his local committee have contributed much to the success of our convention, and
>
> "Whereas Dr. Anselm M. Keefe has so ably and notably edited the *Biologist*
>
> "Be it therefore resolved that thanks be conveyed from Phi Sigma to the A.A.A.S. and to the above named individuals for the services they have rendered to the society and that the secretary be instructed to send copies of these resolutions to the permanent secretary of the A.A.A.S. and to each of the above named individuals."
>
> Resolutions Committee.

Moved by Alpha Lambda that report be accepted. Seconded Upsilon. PASSED.

10:50 Report of Auditing Committee:

> The following report read by Alpha Alpha Delegate:
>
> "The auditing committee have examined the books of the Treasurer Mr. Erwine Hall Stewart, for the period from June 1933 to December 1935.
>
> He uses a simple system, the books are very neat, and in good condition. We wish to report them in a satisfactory condition.".
>
> Auditing Committee.

Psi moves acceptance of report. Alpha Nu seconds. PASSED.

Report of Nominating Committee: Report given by Alpha Kappa. Tellers, O. Grigsby and Clare.

Unanimous agreement to reelect Drs. Ortenburger and Hatch.

Calls for further nominations from the floor for Secretary. CLOSED.

Calls for further nominations from the floor for Vice-Chancellor. CLOSED.

Unanimously carried by rising vote.

11:00 Meeting open for new business.

Iota moves that point 14 listed under the report of the Constitutional Committee be passed (see page 109).

Seconded by Epsilon. Discussion, Alpha Iota, Alpha Lambda, Alpha Nu. PASSED.

Psi—Question regarding Ritual—Iota Ritual O.K.—Beta varies from Ritual by having several different persons "sponsor".

Chair ruled minor variations O.K.

Iota—How far?

Chair—Installation Ritual, for example, requires rewriting at each installation.

Psi—How much modification? Psi makes minor changes.

Phi—New Hampshire has complicated ceremony. Annual fall trip. Quizzing of candidates. Oral examination on biological subjects.

Keefe—Explanation of Ritual.

11:17 Alpha Nu—Still have Cacique.

Alpha Theta—Have Natural History Club which Phi Sigma manages.

Beta—Question, How do other chapters get information re candidates in time to get initiation early enough in year. Those initiated in spring have little contact with chapter. Discussion, Epsilon, Psi, etc.

Keefe—Biologists discussion and requests.

11:45 Alpha Lambda—Moves to adjourn.

NOTHING TO WEAR BUT FOOD

A town guy said to a farmer:

"You ought to be getting along all right. You have your own milk, butter, eggs, meat and vegetables. You have enough to eat and a place to sleep. That's a lot in a depression like this."

"Uh, huh," assented the farmer. "But you come around about eight-nine months from now and you'll find the fattest, sleekest, nakedest farmer you ever saw."—*Eldorado Times.*

MENU HINT

Two teaspoons of caviar a day will cure or prevent rickets in children, tests have proved. This treatment ought to lift the left eyebrow of the child so he can wear a monocle when he grows up, too.—*Food Industries.*

THE SCIENTIFIC PROGRAM

Monday Afternoon Session, December 30, 2:00 p.m., One Suite, Warwick Hotel.

1. Seasonal Fluctuation of Insect Populations in Seral Communities. (15 min.) (Lantern) HAROLD M. HEFLEY, University of Oklahoma.

2. Ecological Morphology and Anatomy of Certain Vascular Plants of Presque Isle, Erie County, Pa. (5 min.) R. V. MORRISSEY, University of Pittsburgh.

3. Ecological Studies of *Arcostaphylos Uva-Ursi* on Presque Isle, Erie County, Pennsylvania. (10 min.) W. R. WITZ, University of Pittsburgh.

4. Distribution and Ecology of Oklahoma Tiger Beetles. (15 min.) O'REILLY SANDOZ, University of Oklahoma.

5. Leaf Differentiation in Flowering Plants. (10 min.) (Lantern) ADRIANCE S. FOSTER, University of California.

6. Bacteriophage as Related to Root Nodule Bacteria. (10 min.) HARRY KATZNELSON, Washington State College.

7. Some Observations on the Ecological Distribution of Certain Trees and Plants in the North Fork River Region of Glacier National Park. (15 min.) ROYAL TURLEY, University of Montana.

8. Vegetation Studies in Panama. (15 min.) (Lantern) RUSSELL SEIBERT, Washington University.

9. Notes on the Paleobotany of Wyoming. (10 min.) (Lantern) H. N. ANDREWS, Washington University.

10. Morphological and Physiological Studies upon a *Penicillium* species Tolerant to Saturated Copper Sulfate. (15 min.) C. L. BEDFORD, University of California.

11. "Five-Leaved" Poison Ivy. (7 min.) FRED A. BARKLEY, Washington University.

12. Distribution of Diatoms in Some Shrimps of St. Louis County, Missouri. (10 min.) R. W. BAXTER, Washington University.

13. Effects of Certain Environmental Conditions in Producing Leaf Variation in Poison Ivy. (10 min.) FRED A. BARKLEY, Washington University.

14. A Study of the Longevity of Moss Spores. (7 min.) H. A. MCQUADE, Washington University.

15. The Life History of *Eisenia arborea* Anesch. (15 min.) (Lantern) C. C. HERBST and T. S. CLARE, University of Southern California.

16. Research in Enology. (10 min.) W. V. CRUESS, University of California.

17. Relation of Bacterial Count to Sediment and Flavor in Butter. (10 min.) EDITH JOHNSON, Montana State College.

18. Seashore Animals and Plants Used as Food by the Pomo Indians of California. (15 min.) O. C. STEWART, University of California.

19. The Vitamins B and G of Fresh Canned and Dried Fruits. (15 min.) HELEN DAVISON, University of California.

20. The Tortugas Laboratory. (15 min.) P. A. NICOLL, Washington University.

21. Cricket Control in Washington. (10 min.) I. W. BALES, Washington State College.

Tuesday Afternoon Session, December 31, 2:00 p.m., One Suite, Warwick Hotel.

22. A Possible Instance of Incipient Speciation in *Rana sphenocephala* Cope. (10 min.) J. D. KILBY, University of Florida.

23. The Markedly Northern Crane-fly Fauna of a Florida Ravine. (10 min.) R. E. BELLAMY, University of Florida.

24. Observations on Cross-breeding in *Pseudacris n. nigrita* (Le Conte) and *Pseudacris ornata* (Holbrook). (10 min.) A. F. CARR, University of Florida.

25. The Headlight as an Aid to the Collecting of Nocturnal Spiders. (5

min.) H. K. Wallace, University of Florida.

26. Observations on the Carbohydrate Nature of the Skeletal Plates in the Ophryoscolecidae. (10 min.) W. H. Brown, University of California.

27. Molts and Plumages of Horned Larks. (10 min.) W. H. Behle, University of California.

28. The Reorganization of *Euplotes patella* during Binary Fission. (15 min.) (Lantern) D. M. Hammond, University of California.

29. Natural Infection of American Trypanosomiasis in *Triatoma protracta* and *Triatoma uhleri*, in Western United States. (10 min.) B. G. Whitaker, University of California.

30. The Effect of Inorganic Chemicals on the Agglutination of the Red Blood Corpuscles of the Blood Groups. (10 min.) Avis D. Johnson, University of New Mexico.

31. Post-spireme Chromosome Length Relations in *Hippiscus*. (10 min.) O'Reilly Sandoz, University of Oklahoma.

32. The Reaction of Some Native Insects to Exotic Food Plants. (10 min.) Harold M. Hefley, University of Oklahoma.

33. *Hydra littoralis* Hyman in Oklahoma. (10 min.) A. N. Bragg, A. H. Trowbridge, and J. T. Self, University of Oklahoma.

34. Distribution of Molluscan Remains in Soil Deposits of Central Oklahoma. (15 min.) R. J. Hedges, University of Oklahoma.

35. The Snails of the Gunnison National Forest, Gothic, Colorado. (10 min.) J. T. Self, University of Oklahoma.

36. A New Record of *Symbos* from Chickasha, Oklahoma. (10 min.) J. T. Self and J. W. Stovall, University of Oklahoma.

37. Some Notes on the Acrididae of Northern Oklahoma. (15 min.) J. H. Bragg, University of Oklahoma.

38. Dusting as a New Means of Control of the Hop Aphis. (5 min.) N. P. Larson, Oregon State Agricultural College.

39. Comparison of Life Cycles of *Eimeria* in Rabbits. (15 min.) (Lantern) R. L. Rutherford, University of Southern California.

40. The Effect of Fat Extraction on Golgi Bodies of the Frog Kidney Cells. (15 min.) H. L. Eastlick, Washington University.

41. Some Differences in Behavior of the Species of *Acmaea*. (10 min.) (Lantern) A. R. Grant, University of California.

42. A Study of Emulsification of High Oil Content Oil-in-Water Emulsions. (5 min.) E. E. Hastrom and I. S. Hall, Syracuse University.

43. The Calorigenic Action of Proteins. (10 min.) Avis D. Johnson, University of New Mexico.

44. A Microscopical Study of the Powdered Vegetable Drugs in the United States Pharmacopoeia, Tenth Revision, and a Key to Their Identification. (5 min.) E. P. Claus, University of Pittsburgh.

45. Pantothenic Acid as a Growth Stimulant for Green Plants. (10 min.) Ewald Rohrman, Oregon State Agricultural College.

46. Immature North American Caddis Flies (Trichoptera) 1. A Summary and Extension of Our Knowledge of These Forms. (10 min.) M. J. Greene and L. J. Milne, Hunter College, Radcliffe College, and Harvard University.

47. The Genus *Espletia:* A. Phylogenetic Study in Taxonomy. (3 min.) A. C. Smith and M. F. Koch, Hunter College and New York Botanical Gardens.

48. Ovulation in the Frog. 2. Follicular Rupture to Fertilization. (5 min.) Roberts Rugh, Hunter College and Columbia University.

49. Genetics of Sensory Thresholds: Variations within Single Individuals in Taste Sensitivity for PTC. (5 min.) T. N. Salmon and A. F. Blakeslee, Hunter College and Carnegie Institution of Washington.

Wednesday Afternoon Session, January 1, 2:00 p.m.; One Suite, Warwick Hotel

50. A Study of the Nuclear Cleft in the Macronucleus of *Uroleptus Halseyi*. (5 min.) M. J. Greene, Hunter College and Columbia University.

51. Studies on the Somites of *Ambystoma punctatum*. (4 min.) B. L. Maclean and H. B. Adelmann, Hunter College and Cornell University.

52. Genetics of Sensory Thresholds: Individual Taste Reactions for Different Substances. (6 min.) T. N. Salmon and A. F. Blakeslee, Hunter College and Carnegie Institution of America.

53. Induced Ovulation and Artificial Fertilization in the Frog. (5 min.) Roberts Rugh, Hunter College and Columbia University.

54. A Prepubertal Reversal of the Sex Difference in the Gonadotropic Hormone Content of the Pituitary Gland of the Rat. (5 min.) H. H. Clarke, Hunter College and Columbia University.

55. A Sex Difference in the Change in Potency of the Anterior Hypophysis Following Bilateral Castration in Newborn Rats. (5 min.) H. H. Clarke, Hunter College and Columbia University.

56. A. Preliminary Survey of a Submarginal Trout Stream in Lower Michigan. (5 min.) W. F. Morofsky, Michigan State College.

57. The Evolution of Some of the North American Snakes of the Genus *Natrix*. (15 min.) (Lantern) W. M. Clay, University of Michigan.

58. Recent Developments in Eastern United States Archaeology. (10 min.) J. B. Griffin, University of Michigan.

59. Algae of the State of Kansas. (10 min.) R. H. Thompson, 1045 Tennessee Street, Lawrence, Kans.

60. Notes on the *Scalaris* Group of the Lizard Genus *Sceloporus*. (7 min.) H. M. Smith, University of Kansas.

61. Effects of X-rays on the Snowy Tree Cricket (*Oecanthus nigricornis argentinus*). (10 min.) E. P. Beach, University of Kansas.

62. Observations on *Paramecium* During Exposure to Sub-Zero Temperature. (5 min.) Charles Wolfson, University of Kansas.

63. The Genus *Listronotus* (Coleoptera: Curulionidae) in North America. (5 min.) L. S. Henderson, University of Kansas.

64. Lime-sulphur Injury. (10 min.) A. M. Jorgenson, University of New Hampshire.

65. Bird Studies at the Isles of Shoals. (15 min.) P. L. Wright, University of New Hampshire.

66. Penetration of Petroleum Oils into Insect Eggs. (10 min.) B. G. Markos, University of New Hampshire.

67. The Gross Anatomy of the Blue Gill Brain. (10 min.) Fred Glenny, University of Akron.

68. A Preliminary Report of Studies Made on the Chub of the Great Basin *Tigoma atraria* Girard. (10 min.) W. F. Carbine, University of Utah.

69. Parasites of the Fish in Glacier National Park. (10 min.) Ival Goslin, University of Utah.

70. Technique for Preparing Microscopic Slides of Woody Stems. (10 min.) W. W. Newby and P. A. Plummer, University of Utah.

71. Thick-billed Redwing Blackbird in Utah. (10 min.) J. H. Linford, University of Utah.

72. Field Characteristics of the Birds of Utah. (10 min.) M. E. Hanson, University of Utah.

73. Effect of Auditory Noises on Learning. (10 min.) Don Grayot, University of Utah.

74. Pycnogonids from Puget Sound. (15 min.) (Lantern) H. I. Exline, University of Washington.

75. Notes on *Microcotyle sebastis* Goto from Puget Sound. (5 min.) Kelshaw Bonham, University of Washington.

76. *Syncoelium filiferum* (Sars) from the Salmon. (5 min.) L. C. Lloyd and J. E. Guberlet, University of Washington.

77. An Inexpensive Glycerol-Free Synthetic Medium for Growing *Mycobacterium tuberculosis*. (5 min.) Sam Cheu Wong, University of Washington.

78. An Inexpensive Synthetic Medium for Growing *Mycobacterium tuberculosis*. (5 min.) Sam Cheu Wong, University of Washington.

79. A Determination of the Hydrogen Ion Concentration Produced by Some Members of the Genus *Mycobacterium* when Grown in Wong's Synthetic Medium. (5 min.) Doris Hirschmann, University of Washington.

80. The Distribution of Marine Bacteria in the Puget Sound Area. (10 Min.) B. S. Henry and Rose Ostroff, University of Washington.

81. Two Wood-Boring Mollusks of Puget Sound. (10 min.) (Lantern) R. C. Miller, D. T. Helms, and J. C. Stickney, University of Washington.

82. The Agonini of Washington. (10 min.) (Lantern) Barbara Gray and M. H. Hatch, University of Washington.

83. Mycorrhiza of *Pseudotsuga taxifolia*. (13 min.) (Lantern) C. H. Harrison, University of Washington.

84. Environmental Effects Produced by Different Types of Forest in the Marginal Forest of Southeastern Nebraska. (10 min.) A. E. Holch, University of Denver.

85. Anti-serum Against Black Widow Spider Venom. (10 min.) (Lantern) F. E. Becker and Fred E. D'Amour, University of Denver.

86. Effects of the Introduction of Blood from Bred Rabbits upon Immature Rabbits. (10 min.) Charlotte Dumont, Fred E. D'Amour, and R. H. Gustafson, University of Denver.

87. Root Habits of Some Ornamental Plants of the Garden. (10 min.) (Lantern) A. E. Holch, University of Denver.

88. The Mechanism of the Ramon Flocculation Reaction. (10 min.) S. Edward Sulkin, Washington University.

89. A Study of the Black Widow Spider *Lautrodects mactans* Fabricius. (10 min.) Elizabeth Burger, William and Mary College.

RULES FOR HANDLING A WOMAN BY ELECTRICITY

If she talks too long—Interrupter
If she wants to be an angel—Transformer
If she is picking your pockets—Detector
If she will meet you half way—Receiver
If she gets too excited—Controller
If she goes up in the air—Condenser
If she wants chocolates—Feeder
If she sings inharmoniously—Tuner
If she is out of town—Telegrapher
If she is a poor cook—Discharger
If she is too fat—Reducer
If she is wrong—Rectifier
If she gossips too much—Regulator
If she becomes upset—Reverser

—*The Locomotive.*

ABSTRACTS OF PAPERS

ECOLOGICAL STUDIES OF ARCTOSTAPHYLOS UVA-URSI ON PRESQUE ISLE, ERIE COUNTY, PENNSYLVANIA.

WARREN RAY WITZ, *Alpha Epsilon.*

The purpose of this investigation has been to study the plant *Arctostaphylos Uva-ursi* as it is found on Presque Isle. This work has involved (1) a study of the plant in its environment with reference to its general form and structure and its relation to other plants; (2) a study of the evaporating power of the atmosphere by the use of porous cup atmometers; (3) a study of the relation between the temperature of the air and soil; (4) a study of the soil to obtain a record of the pH reaction; (5) a study of the soil to obtain some indication of the number of micro-organisms in it; and (6) a study of the mycorrhiza of the plant and its possible connection with some fungus.

Presque Isle is a peninsula extending out into Lake Erie and east along the shore for about seven miles forming Presque Isle Bay, Erie Harbor, opposite the city of Erie. Because of the process of its formation this type of peninsula is called a recurved sand spit. It has been built up by the action of waves and wind resulting in the formation of ponds, sand-plains, and sand dunes. Presque Isle is a type of land formation which provides a series of plant successions from a bare area formation to a climax forest formation. The succession with which this paper is concerned is the Beach-Sand Plain-Heath-Forest Succession.

Arctostaphylos Uva-ursi (Linne) Sprengle, commonly called Bearberry, is a trailing, woody shrub with its branches radiating out on the surface of the ground forming a mat of larger branches and many small upright branches. The distribution on Presque Isle is limited to the series of dunes known as Long Ridge and to the sand-plain north and east of the Ridge.

The absence of seedlings of Bearberry on Presque Isle is partly due to the fact that only 34.93 per cent of the seeds in 1932 were normal.

There are 26 species of Pteridophytes and Spermatophytes found growing on the Bearberry heath. Some of these, *Cypripedium acaule, Juniperus virginiana, Pinus Strobus, Fragaria virginiana, Smilacina racemosa,* and *Pyrola americana,* are protected by the heath and can survive on the sand-plain only through the protection of the heath. Others, *Rhus toxicodendron, Smilacina stellata, and Lupinus perennis,* show some competition with the Bearberry.

The atmometer records of 1930 show the conditions which limit the evaporating power of the atmosphere at the 10 stations. According to these records, the stations may be classified into four groups. (1) The open sand stations show the highest evaporation. (2) The Bearberry stations on the sand-plain have records nearly as high. (3) Two of the Bearberry stations on the dune show a lower record. (4) the three lowest readings group together the Wet Meadow, Myrica, and Pine Stations.

During the period of investigation in 1931, the conditions that affect the evaporating power of the atmosphere were very much different from what they were the year before. The precipitation was five times greater than it was during the period in 1930. The corollation between the evaporation stress and the type of station was relatively the same in 1931 as it was in 1930. The relative grouping of the stations of 1931 checks the grouping of 1930.

The highest temperature taken of the air was 117°F., at 1:30 o'clock in the wet meadow on Aug. 9, 1930, at which time the temperature of the soil was 78°F. The highest soil temperature was 108°F., taken at 5:00 o'clock on Aug. 7, 1930, at a bare sand station. The air at that time was 88°F.

The records of the tests for pH value of the soil at the Bearberry station 11-31, in October 1931, ranged from 6.4 to 7.2. The difference between the pH of the center of the Bearberry mat and that of the sand-plain had a range of 0.8.

The tests taken for an enumeration of the soil forms in the spring and the fall of 1931 showed a decided difference. The soil from the sand-plain showed a count on Lipman and Brown's earthy salts agar at 37°C., of only three million. The count at the edge of the mat was nine million and in the center of the mat 486 million. The same type of tests in October gave counts of 100,000; 200,000; and 4,400,000 respectively. No anaerobic forms were recorded in the spring, but in the fall a count of 600 per gram of soil was made in the center of the Bearberry mat.

Fungus was found associated with the roots of the Bearberry forming an ectendotrophic mycorrhiza. The hyphae of the fungus showed clamp connections which characterize the hyphae of the Basidiomycetes. Associated with the Bearberry mats are always found the mature fruiting bodies of *Geaster hygrometricus*. Investigation showed that the buttons of the Geaster developed from the mycelium in the soil at the same depth that the fungus was found on the roots of the Bearberry. Masses of the mycelium connected to the buttons of the Geaster appeared to be the same as the mycelium connected to the roots of the Bearberry. Although the mycelium of the buttons was not found directly connected to the mycelium that caused the mycorrhiza, the writer assumes that the *Geaster hygrometricus* causes the mycorrhiza on *Arctostaphylos Uva-ursi.*

LEAF DIFFERENTIATION IN FLOWERING PLANTS.

ADRIANCE S. FOSTER, *Omega.*

A brief resume is given of the general problem of leaf differentiation in angiosperms, accompanied by a brief report of investigations on the development of bud scale and foliage leaf in *Carya*. The differentiation of each leaf type is discussed according to three developmental phases viz: (1) the initiation phase, during which the primordia arises as meristematic protuberances at the growing point; (2) the determinative phase, marked by the appearance of specific histogenetic and cytological changes which condition the future career of development of each organ and (3) the phase of maturation, characterized by the complex activities of localized, specific types of embryonic tissue which produce the adult structure and form of the leaf. It is emphasized that a profitable experimental investigation of the factors controlling the form and anatomy of the adult scale or foliage leaf is dependent upon a sound knowledge of the cellular changes accompanying leaf differentiation.

BACTERIOPHAGE AS RELATED TO ROOT NODULE BACTERIA.

H. KATZNELSON, *Alpha Theta.*

Attempts to isolate a lytic principle from nodules of Austrian lentil clover and alfalfa more than two months old grown in experimental pots in the open were unsuccessful. It is suggested that the nodules were too old to carry a "virulent" bacteriophage. Similar attempts with nodules from Austrian lentil six and ten weeks old and with those of alfalfa ten weeks old, grown in the greenhouse in subdued light, did not yield a bacteriophage. Lack of sunlight, which inhibited good nodulation, and age of the nodules are thought to be responsible for these failures. In most of the isolations attempted, dissolution occurred on addition of the original filtrate; but the agent responsible for this clearing was not transmissible.

A *Vetch bacteriophage* maintained in the laboratory was found to be effective at a dilution of $1{:}10^8$. Lysis on solid media or plaque formation and transmissibility of this agent were demonstrated.

Cultures of pea and vetch strains kept at room temperature (20°C) and in a refrigerator (0°C) without transfer for fifteen weeks showed no change in cultural characteristics, other than an increase in viscosity which occurred from three to four weeks after the beginning of the experiment and which persisted to the end. This increased viscosity had no effect whatever on the susceptibility of the strains to lysis.

The above strains decreased in viability because of age, desiccation, and concentration of salts in the medium.

The decrease in viability due to these factors did not have any effect whatever on the susceptibility of the organisms studied within the fifteen-week period of the experiment.

Low temperature seemed to weaken the organisms rather than increase their resistance and hence increased to a certain extent at least, their susceptibility to the lytic principle.

SOME OBSERVATIONS ON THE ECOLOGICAL DISTRIBUTION OF CERTAIN TREES IN THE NORTH FORK RIVER REGION OF GLACIER NATIONAL PARK.

ROYAL TURLEY, *Lambda.*

Whenever the threshold of influence of several elements or causes which produce a result is reached a difference of these elements or causes one way or another often results in interestingly different responses. In this case it is the distribution of certain trees which, when closely approaching their main ecological distribution limits, are locally delimited to areas barely favorable to them and their invasion into areas barely *un*favorable to them prevented.

PLANT COLLECTING IN PANAMA,

R. J. SEIBERT, *Iota Chapter.*

During the months of June, July, and August, 1935, the author accompanied Dr. R. E. Woodson Jr. of the Missouri Botanical Garden, on an expedition to Panama for the express purpose of making a general collection of the Flora of Panama.

For those who are unfamiliar with the extent of the Missouri Botanical Garden, it may be well, here, to explain that the Garden maintains a tropical station at Balboa, Canal Zone. The station is used for growing tropical orchids from various parts of the world, as a haunt for visiting botanists, and as a base for collecting expeditions in Panama.

The collecting was done outside of the Canal Zone and was restricted to three provinces: Chiriqui, Cocle, and Panama. To get into Chiriqui, it was necessary to fly to the Volcan de Chirique, where it is possible to land on the Llanos at the base of the old volcano. Collecting here was done in and near the valley of the Rio Chiriqui Viejo, on the Llanos themselves, and in the valley of the upper Rio Gariche. The altitudes varied between 5000 and 9000 feet. Collecting in Cocle was done in the crator of El Valle de Anton and vicinity and on the Llano Bonito, north of Las Margaritas, altitudes being between 1200 and 2800 feet. The area is accessible by car, though the road leading to the crater is quite poor.

The greatest amount of collecting in the Province of Panama was done in the lower Trinidad River region, where one finds typical dense, wet lowland tropical rain forests.

Opportunities for collecting in Panama are unlimited at the present time. The collections made last summer have revealed a good percentage of new species.* Panama as a whole has been collected very little. There are countless rather inaccessible areas in which no collecting has ever been done. Since the flora varies considerably within comparatively short distances, it seems very likely that extended collecting would be invaluable.

Collecting conditions are, however, not very good, at least in the rainy season. Mould is prevalent and one must be extremely careful in drying specimens. Insects, snakes, fever, drinking water, and food must be watched carefully. In all, it's not the most enjoyable kind of collection from the standpoint of the difficulties. However, this is a small item when one considers the valuable returns that may be obtained.

One point in favor of the collector is the fact that the natives, in the northern and central part of Panama are friendly. By using a little psychology and common sense they may be very helpful to a collector. They may be hired very reasonably if one is accustomed to their tricks and peculiarities. It is possible to stay with them in their huts in spite of the uncleanliness, the "varmints" and insects, and the incessant chatter of the native lingo, which is, incidentally, a valuable language to know in that area.

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* A paper listing the species collected with descriptions of the new species will appear in an early issue of the Annals of the Missouri Botanical Garden.

NOTES ON THE PALEOBOTANY OF WYOMING AND COLORADO.

H. N. ANDREWS JR., *Iota*.

The possibilities for paleobotanical investigations in Wyoming and Colorado are well known. There remains, however, a wealth of material as yet untouched, and but few of the known localities have been worked with any degree of thoroughness.

Dorf's (1) recent paper on the Lower Devonian plants from Bear Tooth Butte indicate the possibilities open to investigation of the most primitive land plants; Mesozoic and Tertiary plants are abundant in many localities, both impressions and petrified remains, and frequently both are closely associated.

During a short collecting trip in the summer of 1934 we were fortunate in obtaining a number of interesting fossil woods from various localities, two of which, to our knowledge, have never been reported.

1. The first of these is the Gros Ventre Canyon, located a few miles east of Teton Park. The specimens we collected had apparently weathered from an Upper Cretaceous horizon. The wood is in an excellent state of preservation and is a representative of the genus Podocarpoxylon. It differs somewhat from previously described species in the type of pitting in the radial walls of the tracheids, which is frequently crowded, mostly opposite when biseriate but not infrequently alternate or showing a tendency toward alternate pitting. (Fig. 8.)

2. The second undescribed locality, at least as regards the occurrence of fossil wood, is to be found shortly north-east of the now extinct town of Cumberland, Wyoming, in the Frontier formation (Upper Cretaceous). Knowlton (3) has described a fossil flora (predominantly dicots with seven ferns, one Equisetum and one supposed monocot) from this locality but his work is based entirely on impressions.

We found fragments of wood to be abundant on the hillside north-east of the town site, all of which is dicot wood, the generic affinities of which we have not yet determined. It is not surprising that the abundant fragments of wood escaped the notice of previous investigators, the fragments having weathered to a light gray color similar to the field rock, and showing externally no indication of the excellent preservation actually present.

3. Thru the kindness of Chief Naturalist C. M. Bauer we were able to make a small collection of fossil plant material in the Yellowstone Park. Among our woods from this region is a specimen apparently identical with Read's (4) *Cupressinoxylon lamarense*. The excellent preservation of our specimen shows the presence of opposite pitting and bars of Sanio, not previously observed in this species. (Fig. 7.)

4. Another well known yet not over-worked source of fossil plants is to be found in the Green River formation. The outcrop shown in Fig. 3. is near the town of Fossil, Wyoming. The formation is well known for its abundance of fossil fish and fan-palm leaves. In the small portion of the outcrop shown in Fig. 2. we obtained within a few square feet and but a few inches in depth, six well preserved fish, a dozen or more insects and the fan-palm leaf—which I have tentatively assigned to the genus Sabalites.

5. The last locality I wish to mention is the Miocene lake bed at Florissant, Colorado. Many of the fossil logs and stumps found in this formation (long famous for its leaf impressions) have been excavated by the owners of the Henderson Fossil Forest, located two and one-half miles from Florissant and it is concerning one of these stumps (Fig. 1.) that I wish to speak in particular. It was mentioned by Gordon (2) as being 17 feet in diameter and supposed to be a Sequoia; it is probably the largest known fossil stump.

The anatomy of the wood is particularly interesting and seems to indicate that the wood is not a Sequoia. Marginal tracheids are present and in the specimen I have no traumatic resin canals are present; neither is the transition from spring to summer wood distinctly of the Sequoia type. (Fig. 2.) The most interesting feature of the wood lies in the summer tracheids which are septated both horizontally and *vertically* (Fig. 3 and 4.) a feature which to my knowledge

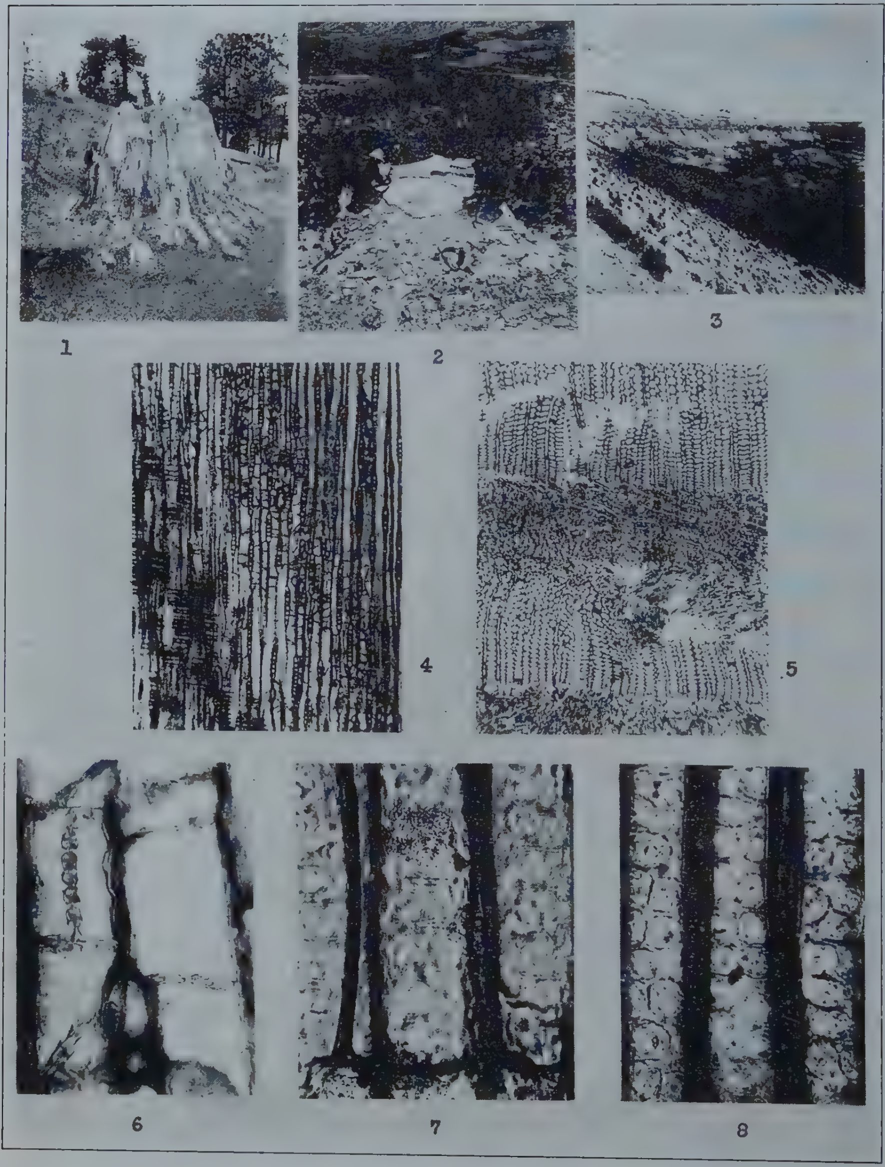


Fig. 1. The largest known fossil stump—Florissant, Colo. 2. Excavating a Sabalites leaf—Green River Formation. 3. Out-crop of Green River Formation near Fossil, Wyo. 4. Tangential section of stump shown in (1)—section thru late summer wood. 5. Cross section of same. 6. Part of (4) more highly magnified. 7. Radial view of Cupressinoxylon lamarense Read. 8. Podocarpoxylon from Gros Ventre Canyon, Wyo.

has never been reported in a living or fossil coniferous wood.

These preliminary notes on our collections will, I believe, serve to indicate the possibilities for the paleobotanist in this region, and particularly in the two previously undescribed localities.

1. Dorf, Erling
   A New Occurrence of the Oldest Known Terrestrial Vegetation, from Bear Tooth Butte, Wyoming. Bot. Gaz. Dec. 1933.
2. Gordon, W. T.
   Plant Life and the Philosophy of Geology. Sectional Address (C), British Association 1935.
3. Knowlton, F. H.
   A Fossil Flora from the Frontier Formation of Southwestern Wyoming. U.S.G.S. Prof. Paper 108-F.
4. Read, C. B.
   Fossil Floras of Yellowstone National Park. Part 1. Coniferous Woods of Lamar River Flora. Carnegie Inst. of Wash. Pub. 416, 1933.

MORPHOLOGICAL AND PHYSIOLOGICAL STUDIES UPON A *PENICILLIUM*, sp. tolerant to Saturated Copper Sulfate,

Clifford L. Bedford, *Mu.*

The writer has recently obtained a *Penicillium* sp. which grows vegetatively but does not sporulate in saturated (20 per cent) copper sulfate solution. Because of its unusual tolerance to copper sulfate some of the morphological and physiological characteristics of this fungus have been studied.

The results may be summarized briefly as follows: The morphological investigations show that the organism is a *Penicillium* sp. in the assymetric-velutina group. Growth in the presence of copper sulfate caused the protoplasm of the hyphae to change from granular to dense. Higher concentrations caused distortion of the hyphae.

The organism utilized sucrose, dextrose maltose, lactose, and starch very readily and acetic, lactic, citric, and tartaric acids with difficulty. Organic acids were used as a source of carbon after the sugars had been utilized. The most suitable nitrogen sources were the ammonium salts of the organic acids.

Growth occurred at all concentrations of copper sulfate. The amount of copper in the ash was found to depend on the concentration of copper in the external solution at the lower concentrations, below 1600 to 2000 p.p.m. of copper, but was independent of the copper concentration of the medium at higher concentrations. The copper was firmly fixed in the mycelium and could not be removed by leaching with water, dilute acids or ether.

Other copper salts exhibited toxic concentrations below saturation thus toxicity appeared to depend upon the anions. The following order of decreasing toxicity was found for the anions: $AcClNO_3$. The order of toxicity of these three ions is contrary to that which one would expect if it depended upon the pH effect of increasing acidity. The toxic concentrations were for $CuAc_2$ between 800 to 1600 p.p.m. of copper, for $CuCl_2$, between 4800 to 6000 p.p.m. of copper and for copper nitrate between 9000 to 10,000 p.p.m. of copper.

The effect of other heavy metal cations gave the following order of decreasing toxicity Hg, Ag, Co, Ni, Pb, Cd. The toxic concentration of Hg was between 40 and 70 p.p.m. whereas with Cd it was between 24,000 and 25,000 p.p.m. Fe, Mn, Zn showed no toxicity at 30,000 p.p.m. The toxic concentration of these three cations was not obtained.

"FIVE-LEAVED" POISON IVY.

FRED A. BARKLEY, *Iota.*

An occasional reference is made in literature to poison-ivy leaves with five leaflets (particularly in *Rhus diversiloba*). During his study of the specimens of poison-ivy in the Herbarium of the Missouri Botanical Garden, the author rather infrequently has found specimens with a few five-foliolate leaves (fig. 1, lower right). Therefore, he was surprised to find five-foliolate leaves appearing on experimental material.

Seeds of *Rhus Toxicodendron* L. sent to the author from Texas, through the courtesy of F. McAllister, were planted in the greenhouse in January 1935, in neutral soil (pH 7.10 and pH 7.25).

The plants produced incised leaflets, three in number per leaf until the last of August. However, at that time, the plants began to produce leaves with two extra leaflets more or less separate from the terminal leaflet, several of which were definitely pinnately five-foliolate (fig. 2f).

(The "five-leaved" ivy (*Psedera quinquefolia* (L.) Greene) which is sometimes confused with "three-leaved" ivy (*Rhus* spp.), is palmately compound, in contrast to the pinnately compound five-foliolate *Rhus* leaves.)

The explanation of the appearance of extra leaflets must await further study; however due to their appearance at the end of a season's growth it seems likely that their occurrence may be bound up in the complicated (and almost untouched) problem of foliar seriation (c.f. Foster & Barkley, 1933, American Journal of Botany *20:* 365-385, and Barkley, 1933, The Biologist *15:* 66-67.)

THE EFFECTS OF CERTAIN ENVIRONMENTAL CONDITIONS IN PRODUCING LEAF VARIATION IN POISON IVY.

FRED A. BARKLEY.

Attention has been called by many authors to the extreme variation (fig. 1) found in the poisonous three-foliolate species of *Rhus* (as well as most other entities in the genus *Rhus sensu latissimus*). In an attempt to determine some of the effects of different soils on leaf variation seeds of each *Rhu diversiloba* T. & G., *Rhus quercifolia* (Michx.) Steud., and *Rhus Toxicodendron* L. (furnished through the courtesy of R. C. Rollins, H. B. Parks, and F. McAllister, respectively) were germinated and grown in pots of neutral and alkaline soil (table I) on greenhouse benches.

TABLE I—pH of soil in which poison ivy plants were grown. Determined at the end of the experiment by the glass electrode method.

	R. Toxicodendron	R. quercifolia	R. diversiloba
Alkaline	9.62	8.59	8.75
Neutral	7.25	6.92	7.59

The plants grown in neutral soil were in each case large and vigorous, while those grown in alkaline soil were very noticeably dwarfed. The leaf morphology however was not essentially altered.

To determine the effect of light, seeds of *Rhus Toxicodendron* L. were germinated and grown in deep shade under a bench in the greenhouse. The plant grown in light was noticeably more vigorous than the one grown in the shade. The leaf morphology was not altered.

From this study it would appear that soil pH and shading are not important contributing factors in the leaf variation found among the members of the species of poison ivy.

The author is indebted to Dr. F. L. Wynd for his assistance in determination of soil pH: to Drs. G. T. Moore and J. M. Greenman for their council and for the facilities at the Missouri Botanical Garden so generously afforded the author during his study.

NOTE: *The author would appreciate receiving fresh, pickled, or dried material of flowers, seed, or specimens for his study of the genus Rhus and its immediate allies of the Western Hemisphere.*

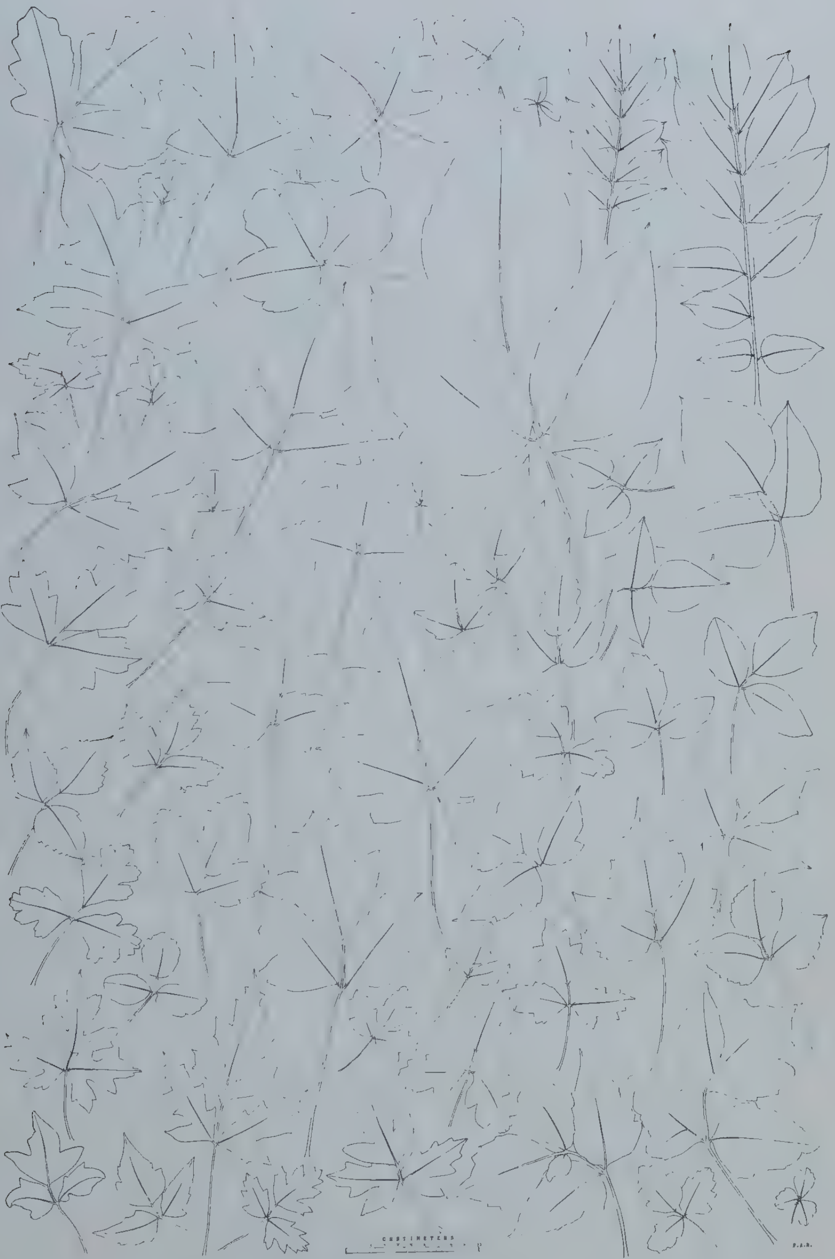


Figure 1. Tracings of the leaves of *Rhus Vernix* L. (upper right) and of *Rhus Toxicodendron* L. and its segregates. Note the extreme variation in the latter.

THE LIFE-HISTORY OF EISENIA ARBOREA *ARESCH.*

THEMA SHULTS CLARE and CHARLES C. HERBST, *Alpha Alpha.*

Additional evidence is presented in the presentation of the life-history of *Eisenia arborea* Aresch in support of the view that antithetic alternation of generations is generally present throughout the order Laminariales.

Most of the material for investigation was collected at Laguna Beach because of the absence of epiphytic forms. Spores were cultured in Kylin's nutrient solution in a specially constructed glass-enclosed culture cabinet with the temperature ranging from 8° to 12° C.

The investigation showed that:

1. The massive sporophyte alternates with the microscopic gametophyte generation.
2. That spores are morphologically homosporous but physiologically different, non-motile, and arise from unmilocular sporangia.
3. After the formation of the germ tube, the gametophytes may give rise to one filament, or also to a second filament in the opposite direction.
4. Microgametophytes are smaller than the female plants and produce antheridia with a single sperm in clusters at tips of lateral branches.
5. Megagametophytes are larger and more branched than male plants and produce a single oogonium at the tips of the branch. The egg is extruded and apparently soon fertilized thereafter.
6. The young sporophytes are monostromatic.

RESEARCH IN ENOLOGY AT UNIVERSITY OF CALIFORNIA.

W. V. CRUESS, *Mu.*

Since repeal many technical problems in the making of fruit wines (enology) have arisen in California. Research upon the following problems is under way or has been completed.

In order to satisfy the demand of the consumer that wine must remain brilliantly clear under all circumstances, an extensive investigation has been necessary to determine the temperature and duration of refrigeration required to render both dry and sweet wines stable against deposition of excess cream of tartar and clouding due to separation of certain colloids. The clarification of wine, involving both filtration to render wines brilliantly clear and the use of certain fining agents such as Bentonite, a new wine clarifying agent developed by this laboratory, has been given much attention.

The changes during aging and methods of hastening and improving the aging of various wines have been investigated. As a part of the general investigation upon the stabilization of wine it has been necessary to study such problems as the spoilage of wine by tourne bacteria and by certain wild yeasts. Both of these types of spoilage have now been controlled, or at least the knowledge for successful control is now available. The effect of metals on wine and of wine on metals is under study. Certain properties of a number of strains of S. ellipsoideus, true wine yeast, are being investigated.

In addition to the above lines of study in the Fruit Products Laboratory, an investigation is being made by the Viticulture staff of the University of the effect of variety, locality and method of growing grapes upon their quality for use in wine making.

In general the purpose of all these investigations is to improve the fermented product of the grape.

RELATION OF THE BACTERIAL COUNT TO SEDIMENT AND FLAVOR IN BUTTER.

EDITH JOHNSON, *Chi.*

Until recently little attention has been given to quantitative studies of "visible dirt" in butter. As butter is opaque, considerable amounts of barnyard material, insect parts, molds, etc., may be present without attracting particular attention.

In 1933 the Federal Pure Food and Drugs Commission noted the presence of such materials in samples of butter examined by them, and further study revealed the fact that even brands of butter of high repute contained such materials. These findings stimulated further investigations by state authorities in a number of places.

The study here reported was made for a Bachelor of Science thesis in the Department of Bacteriology of the Montana State College at the suggestion of Dr. J. A. Nelson, head of the Dairy Department of that institution. The butters studied were those sent in for examination at monthly intervals from all parts of the state.

This study is concerned with relation of solid foreign material to bacterial count and butter flavor, for no data were available to show whether those undesirable flavors produced by bacterial action are introduced with these foreign materials or by such other means as would leave no visible deposits. Furthermore it was interesting to learn whether or not these foreign materials would introduce bacteria in such numbers as to leave a permanent impression on the total bacterial count at the end of the process of butter manufacture. A further aspect of this study was to determine what species of bacteria were responsible for certain disagreeable flavors encountered.

Materials and Methods

The relative amounts of sediment were determined by the Dairy Department by a method devised there in which the butters were melted, treated with a 10% solution of borax to soften the curd, and filtered through white cotton pads on which the sediment was easily visible. The following scale was thus established by sight comparison:

9.5 to 10	very clean
9.0 to 9.4	clean
8.5 to 8.9	fairly clean
7.5 to 8.4	fairly dirty
6.5 to 7.4	dirty
3.0 to 6.4	very dirty
below 3.0	filthy (molds, insect parts, barnyard filth)

Flavor scores were also made by the Dairy Department. The range and interpretation of figures is as follows:

38 to 40	excellent flavor
36 to 37	good flavor
35	average flavor
34	fair flavor
32 to 33	poor flavor
below 32	not fit for table use

They were used by the author along with the sediment scores to see if there was a significant correlation between these or either of them and the number of bacteria as determined by the plate count of colonies in standard beef-infusion agar.

Experimental Data

Isolation of bacteria was done by adding a portion of the butter, melted at a temperature of about 45° C., to warm sterile water, shaking, and then plating in beef-infusion agar. No attempt was made to isolate strict anaerobes of the genus Clostridium. Representative colonies were transferred from the plates and isolated with the aid of Bergey's Manual of Determinative Bacteriology, 4th edition.

Following is a list of the organisms isolated.

Bacillus albolactis Migula
Bacillus amarus Hammer
Bacillus kaustophilus Pickett
Micrococcus candidus Cohn.
Micrococcus cremoris-viscosi (Hammer and Cordes) Bergey, et al.
Micrococcus flavescens Henrici
Micrococcus freudenreichii Guillebeau
Sarcina aurantiaca Flugge
Sarcina hamaguchii Saito
Sarcina lactea Bergey, et al.
Sarcina subflava Ravenel
Streptococcus thermophilus Orla-Jensen

Pasteurized cream of good quality was inoculated with cultures of each of these organisms and after a period of about 18 hours they were churned into butter. Table I shows the effects of these bacteria on odor and flavor of these butters.

TABLE I

Organism	Odor	Flavor
B. albolactis	Musty, sour	Metallic
B. amarus	Satisfactory	Bitter disagreeable
B. kaustophilus	Sweet, rancid	Sour, old
Mic candidus	Satisfactory	Old, greasy
Mic. cremoris-viscosi	Musty, disagreeable	Putrid
Mic. flavescens	Satisfactory	Unsatisfactory
Mic. freudenreichii	Undesirable	Disagreeable
Sar. aurantiaca	Disagreeable, sour	Sour, greasy
Sar. hamaguchii	Musty	Flat, metallic
Sar. lactea	Satisfactory	Old
Sar. subflava	Sweet, old	Rancid
Strep. thermophilus	Satisfactory	Sour

The correlation of the sediment and bacterial count was found under three different circumstances. In the first case a correlation was run using the counts and sediment scores over the entire period from November to April inclusive. A correlation coefficient of 0.153 was found in that case. The second correlation was run on all counts below 200,000 bacteria per cc., with the corresponding sediment score. This was done to find if the correlation coefficient is higher where more frequencies are present. The correlation here was 0.319, 0.166 higher than the previous one. In the third case the correlation was found for sediment and all counts above 200,000 bacteria per cc. In this case the correlation was 0.139, the least of any and showing that there was practically no relationship between the sediment and bacterial count.

TABLE II

Showing the bacterial count, the flavor, and the sediment of each sample of butter taken every month from November 1934, to April 1935, inclusive.

(For the interpretation of the figures representing flavor and sediment see explanation, page 125)

November samples

Plate count	Flavor	Sediment
73,000	37	8.8
1,230,000	37	9.1
20,000	37	9.0
720,000	37	8.5
83,000	36.5	7.5
141,000	36.5	8.2
183,000	36.5	8.5
54,000	36	7.9
82,000	36	9.3
1,010,000	36	8.4
17,000	35	8.0
87,000	35.5	8.3
28,000	35.5	8.8
29,000	35	8.9
750,000	35	8.0
58,000	35	8.0
21,000	35	8.7
40,000	35	8.4
26,000	35	8.7
143,000	35	8.8
42,000	35	8.0
46,000	30	9.3
9,000	30	7.4
5,000	34.5	8.5
33,000	34.5	7.8
108,000	35	9.0
166,000	35	9.0
510,000	34	7.0
352,000	34	8.4
32,000	34	8.4
720,000	31	7.5
208,000	30	8.8
62,000	32	8.0
73,000	31	8.8
101,000	30	8.2
142,000	30	8.5

December samples

Plate count	Flavor	Sediment
14,000	37	9.3
42,000	37	9.0
1,230,000	36	8.9
4,000	36	8.9
20,000	36	8.6
40,000	36	8.8
22,000	36	8.7
1,300,000	35.5	8.5
14,000	35.5	8.5
45,000	35.5	8.4
420,000	35.5	8.2
730,000	36	8.0
105,000	35	8.1
13,000	35	7.6
5,000	35	9.1
53,000	35	7.8
17,000	35	8.2
20,000	35	8.5
160,000	35	7.5
23,000	35	7.7
1,320,000	35	8.3
13,000	34.5	8.8
125,000	35	6.8
30,000	34	8.5
840,000	34	7.6
6,000	34	8.8
255,000	34	6.0
260,000	34	7.4
16,000	33.5	6.5
4,000	33.5	8.2
43,000	33	8.3
200,000	32	8.2
280,000	32	8.2

January samples

Plate count	Flavor	Sediment
14,000	38	8.8
97,000	38	7.4
6,000	38	8.0
5,000	37	8.5

January samples

Plate count	Flavor	Sediment
17,000	37	9.0
27,000	37	9.2
3,000	37	8.5
4,000	36.5	7.0
262,000	36.5	8.3
207,000	36	8.1
347,000	36	8.5
10,000	36	8.2
7,000	36	8.5
3,000	36	8.3
9,000	35.5	8.5
167,000	35.5	8.3
5,000	35	6.5
10,000	35	7.6
35,000	35	7.0
16,000	35	7.5
4,000	35	8.3
8,000	35	9.0
19,000	35	7.8
5,000	35	7.8
3,000	35	8.2
3,000	35	8.2
2,000	34	8.0
158,000	34	6.0
271,000	34	6.0
8,000	34	8.0
517,000	31	8.2
78,000	36.5	8.8
7,000	36.5	8.5
86,000	36	8.6
4,000	35	7.3
89,000	32	8.0
9,000	38	8.0
275,000	38	7.7
4,000	37.5	8.0
9,000	37	7.5

February samples

Plate count	Flavor	Sediment
40,000	37	7.8
31,000	37	7.5
5,000	37	8.8
7,000	37	8.7
54,000	37	8.7
112,000	37	8.9
319,000	37	9.2
5,000	36.5	9.5
7,000	36	9.0
6,000	36	7.0
5,000	36	6.8
4,000	36	9.0
6,000	35.5	5.8
18,000	35.5	8.2
143,000	35	9.5
40,000	35	8.9
720,000	35	6.5
20,000	35	8.7
6,000	35	8.4
89,000	35	9.4
12,000	35	8.1
6,000	35	7.8
18,000	35	7.7
8,000	35	6.2
10,000	35	8.0
8,000	34.5	6.0
7,000	34	8.0
77,000	34	7.5
6,000	33	8.9
6,000	33	6.0
4,000	31	9.0
4,000	35.5	9.1
5,000	35.5	8.5
2,000	35.5	8.7

March samples

Plate count	Flavor	Sediment
77,000	38	8.5
17,000	37	9.6
101,000	37	9.4
23,000	37	9.0
12,000	36.5	8.5
7,000	36.5	9.5
47,000	36.5	9.3
38,000	36.5	9.3
5,000	36	8.7
6,000	36	9.8
270,000	36	8.7
6,000	36	8.0
239,000	36	8.0
8,000	36	7.8
86,000	35.5	8.8
86,000	35.5	8.0
9,000	35.5	8.6
5,000	36	9.2
7,000	35	8.3
8,000	35	8.0
5,000	35	8.3
169,000	35	9.5
7,000	35	9.8
7,000	35	9.8
212,000	35	8.4
4,000	35	8.8
25,000	35	8.2
9,000	35	8.8
6,000	34.5	9.0
10,000	34	9.0
26,000	34	8.0
19,000	33	8.5
675,000	32	8.0
126,000	32	6.8
12,000	35.5	8.6
8,000	35.5	9.3

April samples

Plate count	Flavor	Sediment
9,500	38	9.0
10,000	38	9.3
4,000	37	9.9
6,000	37	9.3
15,000	37	9.3
19,000	36	9.5
24,000	36	9.0
41,000	36	9.5
7,000	35.5	9.5
4,000	35.5	9.4
11,000	35.5	9.4
59,000	35.5	7.5
8,000	36	9.4
3,000	35	9.6
6,000	35	8.6
2,500	35	9.3
4,000	35	8.8
18,000	35	7.5
4,000	35	8.8
23,000	34	9.0
24,000	34	9.0
530,000	34	8.5
6,000	34	8.6
15,000	34	8.8
14,000	33	9.4
176,000	33	9.4
12,000	33	8.6
94,000	33	8.4
2,500	32	8.4

Discussion of Results

In determining the off flavor and odor caused by bacterial action it is not practicable to simply reinoculate a butter sample whose flavor and odor are good with the bacteria that are to be tested. The bacteria would not be distributed evenly throughout the butter and furthermore the lack of oxygen, water and protein food, and the presence of salt would prevent multiplication and activity of the organisms introduced. Therefore, the author introduced the cultures into the cream to be made into butter as stated. It is worthy of note that those bacterial species that produced disagreeable flavors were gelatin liquefiers, and that all the bacteria isolated from the butter (mostly made from pasteurized cream) were gram positive.

The sediment correlations show that there is no relation between the bacterial count of butter and the abundance of sediment which it contains. Where all the scores and all the bacterial counts were taken into consideration the author found the correlation to be so small, namely, 0.153, that it was safe to say that there was no relationship between the two. However, it seemed possible that there might be a correlation between these two where the frequencies were more abundant. Accordingly, a correlation was run between the two on a larger scale when the bacterial count was below 200,000 per cc. Although the coefficient here was slightly higher, that is 0.319, still it was small enough to indicate that no conclusion could be drawn regarding the relations between the bacterial count and sediment score. Also, the correlation coefficient was calculated between the bacterial counts exceeding 200,000 per cc. and the sediment found in the corresponding samples. In the last case this correlation was even less than in either of the others, that is 0.319. It can, therefore, be safely stated that no relationship exists between the bacterial count and the sediment in the samples of butter studied.

THE SEASHORE ANIMALS AND PLANTS USED FOR FOOD BY THE POMO INDIANS.

Omer C. Stewart, *Mu*.

The Pomo Indian territory includes the drainage of the Russian River and the drainage of Clear Lake. Starting about 35 miles north of San Francisco, it extends north about 90 miles; bounded on the west by the Pacific Ocean, the area extends east about 75 miles at its widest place, but is narrower at both the northern and southern ends. The Indians living on the shores of Clear Lake obtained sufficient food from the lake to replace the sea-food used by the other Indians. Most of the remaining population lived in the valley of the Russian River 20 to 40 miles from the coast, but the foods mentioned below were all known and used by them. During the summers as many as could would go to the coast and carry home great quantities of food which would not spoil.

15 types of seashore animals and 3 types of sea plants were described by the old Indians as common fare and the native names were given them. These were: Sea Anemone, Sea Urchin,

Sea Cucumber, Goose Barnacles, Acorn Barnacles, Crabs, Mussels, Clams, Abalone, Limpet, China Slipper (Giant Chiton), Baby Slipper (Chiton), Devil Fish, Periwinkle, Lobster, and Seaweed, Giant Kelp and Baby Kelp.

The shells from many of these were found in ancient Shell Mounds which suggests that these animals have been used for centuries.

THE EFFECTS OF CANNING AND OF SULFURING UPON THE VITAMIN B AND G CONTENT OF FRUITS.

Helen G. Davidson, *Mu.*

The purpose of this study was to determine quantitatively the effects of canning and of sulfuring upon the vitamin B and G content of fruit (B_1 and B_2). The rat growth methods, techniques and basal diets of Chase and Bourquin respectively were used for the vitamin B and G tests on fresh canned sulfured and unsulfured apricots and peaches. It was found that from 30 to 50 percent of the vitamin B content of these fruits was lost in commercial methods of canning, depending on the quantity of water used, the natural acidity of the fruit and the internal temperature attained during the canning. Vitamin G is relatively stable to such processes. Little difference was found between the exhaust and vacuum seal methods of canning. Preliminary experiments suggested about a 30% loss of vitamin G into the canning liquor. Sulfuring preceding sun-drying effected a loss of 37 to 50 percent of the vitamin B and about 25 percent of the vitamin G content of these fruits. The vitamin B and G deficiency symptoms were described and discussed. Several interesting types of vitamin G deficiency were noted—including the specific and the non-specific dermatites and cataracts. About 600 animals were used in the study.

CRICKET CONTROL IN WASHINGTON.

Irvin W. Bales, *Alpha Theta.*

Outbreaks of Mormon (Anabrus simplex) and Coulee (Peranabrus scabricollis) crickets have occurred in the State of Washington several times during the past sixty-five years. During the past three years the Mormon cricket and the Coulee cricket have menaced crops in Franklin and Chelan counties respectively.

In the past mechanical control measures such as trenching the soil, building barriers, and burning vegetation have been relied upon considerably. Arsenical dust (one pound white sodium arsenite to four pounds of hydrated lime) is the chief means of control at the present time. Trenching is an auxiliary control measure in some localities.

No insect enemies of the cricket have been observed in Washington.

A POSSIBLE INSTANCE OF INCIPIENT SPECIATION IN *RANA SPHENOCEPHALA COPE,*

John D. Kilby, *Sigma.*

A completely isolated group of Southern Leopard frogs, *Rana sphenocephala* Cope was found in a salt-flat cistern on the southern tip of Florida near Flamingo. These frogs, unlike the *R. sphenocephala* in other parts of the state, are mottled with purplish-blue on the entire ventral surface. A ground color of orange is prominent on the lower extremities and extends anteriorly along the sides as far as the arms. Structural variations are not distinct.

THE MARKEDLY NORTHERN CRANE-FLY FAUNA OF A FLORIDA RAVINE.

R. Edward Bellamy, *Sigma.*

Botanists and Zoologists commonly divide Florida into three regions: 1. West Florida, the northwest extension of the state, 2. North Florida, the rest of the northern part of the state, and 3. Peninsular Florida, the southern part of the state from near Gainesville southward. Previous work on the crane-flies of the state by Prof. Rogers of the University of Florida has shown that certain places in West Florida have a crane-fly fauna that is not only richer in species than that of the rest of the state but that shows marked northern affinities. The northern aspect of this fauna is especially striking in that considerable field work indicates that it is disjunct, that the fauna does not occur in southern Georgia and Alabama but is quite similar to that of the southern upper Piedmont and Appalachian region.

Not all of West Slorida shows this rich fauna of largely northern species; rather, it has been found to be confined to a number of deep mesophytic ravines and creek bottoms in the Appalachicola River drainage system in Jackson and Liberty Counties. Recently, however, another restricted locality has been discovered in the Red Clay Hills of Leon County some fifty miles east of the Appalachicola River, where the crane-fly fauna has even a more markedly northern aspect than that of the localities previously known; and where four species have been taken which were hitherto known from no farther south than the mountains of Tennessee and the upper Piedmont region of northern Georgia and South Carolina.

This restricted locality is a ravine in Leon County about four miles north of the State Capitol Building at Tallahassee. It is called *Hydrangea Ravine* because of the Wild Hydrangea (*Hydrangea arborescens* L.) that flourishes there. A rich climax growth of Beech and Magnolia covers its sloping sides. Various cool springs in an area with a radius of roughly one quarter mile send down small creeks to form the main stream. Some of the creeks are rather swift whereas others loiter along through ferny regions and are almost choked by plant debris. During dry seasons the system of springs is found to have little less flow of water than normally, and in wet seasons the flow is not much greater.

The multiplicity of habitats, rather well guaranteed for constancy, is undoubtedly of the greatest significance in the explanation of the rich crane-fly fauna of the ravine.

The Florida list of crane-flies is a growing one and at present consists of 153 recorded species. Sixty-six of these have been taken in Hydrangea Ravine since it was first collected for crane-flies in May, 1935. The four species which have been taken nowhere in Florida except at Hydrangea Ravine are: 1. *Longurio testaceus* Loew, 2. *Erioptera* (*Erioptera*) *chlorophylla* O. S., 3. *Limnophila* (*Elaeophila*) *solstitialis* Alex., and 4. *Molophilus fultonensis* Alex. Southern forms are not excluded from this and other West Florida ravines; on the contrary, a few reach their northern limit of distribution here.

RECIPROCAL CROSS FERTILIZATION IN *PSEUDACRIS N. NIGRITA* (LeCONTE) and *PSEUDACRIS ORNATA* (HOLBROOK).

A. F. Carr, Jr., *Sigma.*

Concurrence of and close association during breeding season in the two species is discussed; evidence is advanced which may account for the double choruses by the reciprocally stimulating effect of the calls of the two forms.

Reciprocal crosses were made, and tadpoles obtained. These apparently died of starvation.

THE HEADLIGHT AS AN AID TO THE COLLECTING OF NOCTURNAL SPIDERS.

Howard K. Wallace, *Sigma.*

The eyes of many spiders shine brilliantly in the light from a headlight. At least in some parts of the country this is by far the most profitable method of collecting. Other methods, such as sifting, sweeping, beating, turning over rotten logs, etc., may be carried out at night just as well as in the daytime. Orthopterists, Herpetologists, and others use this means of collecting extensively. The headlight is also suggested as a means of observing reef fishes, squids, and other forms difficult to approach during the day; breeding and feeding activities of nocturnal animals.

OBSERVATIONS ON THE CHEMICAL NATURE OF THE SKELETAL PLATELETS IN A GROUP OF THE OLIGOTRICHA, THE OPHRYOSCOLECIDAE.

William H. Brown, *Mu.*

Various authors have described the skeletal elements in a group of the Oligotricha, the Ophryoscolecidae, and have given conflicting reports relative to their chemical nature. In practically all instances the iodine-staining properties of the substance of the platelets were utilized as a basis for the interpretations. This work was repeated and the affect of different solvents on the avidity of the skeletal platelets for iodine was used as a criterion. It was concluded that at best the iodine-staining reactions were only presumptive tests. The study of glycogen distribution by means of techniques utilizing the higher grades of alcohol only give a qualitative measure and not an actual distribution pattern. The substance of the platelets probably represents a conjugated protein which may be either a glyco- or a lipo-protein.

THE MOLTS AND PLUMAGES OF HORNED LARKS.

William H. Behle, *Mu.*

As a prerequisite to a systematic study of Horned Larks (*Otocoris alpestris*) the molts and plumages of certain western races have been worked out. Most of the material forming the basis for the following conclusions was collected by the author before during and after the birds' nesting season. These materials are now deposited in the California Museum of Vertebrate Zoology.

The natal down of these birds is replaced during the post natal molt by the juvenal plumage. This molt commences while the bird is in the nest and is usually complete about the time the bird starts to move about. The juvenal plumage persists for several weeks and is lost during the post juvenal, or first fall molt, which is a complete molt. At this time the first winter plumage is assumed, which is indistinguishable from adult plumage. There is no prenuptial molt, but wear produces a breeding plumage that is very different from the fall dress. Adult Horned Larks have only one annual molt per year, which is also complete and is a post nuptial molt. The sequence of feather replacement has been worked out for both the annual fall molt and the post juvenal molt, and has been found to be same in each.

REORGANIZATION IN *EUPLOTES PATELLA* DURING BINARY FISSION.

Datus M. Hammond, *Mu.*

Euplotes patella is one of the most complex organisms among the Protozoa, or one celled animals. It reproduces by splitting transversely into two halves, each of which then becomes a complete organism. This process is called binary fission. It is accompanied by extensive changes in the organization of the individual. Preparatory to separation of the two daughter organisms the composite organs, called cirri, which serve for locomotion are all resorbed and replaced by two new sets, one for each daughter organism. A new peristome or mouth and organs appertaining thereto, is developed for the posterior daughter, while the anterior daughter retains the old one.

Simultaneously with these changes, the hair-like bristles, supposedly sensory in function, which are arranged in longitudinal rows on the dorsal surface undergo a process of multiplication. This occurs by a series of divisions of each of those basal granule from which the bristles arise, which lie in the middle region of the body. Apparently the old bristles are retained, and only enough new ones are developed so that each daughter will have a complete set.

The surface of the organism is covered with a polygonal network of delicate lines, supposed by some workers (Klein, 1929, Turner, 1934) to lie nervous in function. During binary fission new networks start developing in small areas independently at different points on the surface of the body. These gradually spread out, with inlargement of meshes and at the same time the old net work is resorbed. This process continues until the different parts of the new network come together to form an integrated pattern. This new system then covers the entire surface of the body with the exception of the old peristome. This is an interesting phenomenon biologically because it involves some unknown means of coordination in developing a complete and perfect whole pattern from the originally independent and separate parts.

NATURAL INFECTION OF AMERICAN TRYPANOSOMIASIS IN *TRIATOMA PROTRACTA* AND *TRIATOMA UHLERI*, IN WESTERN UNITED STATES.

BRUCE G. WHITAKER, *Mu.*

Kofoid and McCulloch in 1916 reported the occurrence of a trypanosome, which later proved to be *Trypanosoma cruzi* Chagas, in the cone-nosed bug, *Triatoma protracta* Uhler. These infected bugs were collected near San Diego, California. The author recently examined seventy-nine specimens of *Triatoma uhleri* Neiva collected near Tucson, Arizona, through the courtesy of Dr. L. P. Wehrle. Seven of these bugs were discharging in their faeces large numbers of *Trypanosoma cruzi* in the infective stage. The identity of the trypanosome was definitely established by intraperitoneal inoculation of the infected faeces into a twenty-one-day-old *Peromyscus californicus insignis* Rhoads. Trypanosomes were observed in the peripheral blood of the mouse from the seventh to the thirty-seventh day after inoculation, at which time the animal was sacrificed and impression smears made from heart muscle. Large numbers of leishmaniform bodies, a diagnostic characteristic of *T. cruzi* were found in these smears. This discovery incriminates another species of cone-nosed bug, *Triatoma* uhleri, as a vector of *Trypanosoma cruzi* and extends the known distribution of the parasite in the United States.

THE EFFECT OF INORGANIC CHEMICALS ON THE AGGLUTINATION OF CORPUSCLES OF THE FOUR BLOOD GROUPS.

AVIS D. JOHNSON, *Mu.*

Corpuscles of the four blood groups have been tested for agglutination with a representative selection of 191 inorganic chemicals made up in 1% solution using 0.9% physiological salt solution. Of these chemicals only 4 vary toward agglutination of the four groups; 180 chemicals caused the cells of all four groups to agglutinate. The chemicals which gave varying results on agglutination were without exception aluminum compounds. It is also shown in this group that group AB does not act exactly as combined groups A and B as is now generally believed.

A NEW RECORD OF *HYDRA LITTORALIS* HYMAN,

ALBERT H. TROWBRIDGE, ARTHUR N. BRAGG, and J. TEAGUE SELF, *Omega.*

Hydra littoralis Hyman was collected in Comanche County, Oklahoma, March 17, 1935. The animals were in a flowing stream, under stones, and in association with a swift stream fauna. Many specimens were budding. Others had immature sex organs. All sexual individuals were young males. These facts fulfill Hyman's predictions that this Hydra would be found in streams. They also show that *H. littoralis* may become sexual in the spring as well as in the autumn.

DISTRIBUTION OF MOLLUSCAN REMAINS IN SOIL DEPOSITS OF CENTRAL OKLAHOMA.

R. FRANK HEDGES, *Omega.*

This investigation is an attempt to find what species of Molluscs are present in the soil deposits of central Oklahoma and their relative abundance in the individual layers of the deposits. It is the only study of its kind that has been made in Oklahoma.

Five stations, in which twenty-seven soil layers were exposed, were selected for collection in the region near Norman, Oklahoma. The layers were alternately black and red. General collections were taken from each station and quantitative collections from each layer.

Thirty-three terrestrial species, which were especially considered, and nineteen fresh-water species, were found in the general collections. The quantitative collections yielded twenty-two species, two of which were fresh-water forms.

The Molluscan remains in the black layers were found to be 11.5 times as abundant as in the red layers. The average for the eight black layers yielding the largest number of specimens was one specimen per 8.7 grams of soil, while the average for the two red layers yielding the largest number of specimens was one specimen per 100 grams of soil.

The large species in the region studied were limited to the black layers. These species compare with the species found in the forest-edge, or in the forest interior of Iowa. This and the fact that the total Molluscan remains are 11.5 times as abundant in the black layers as in the red, indicate that the black layers in central Oklahoma were deposited under more humid conditions than were the red.

The presence of a greater amount of humus in the black layers shows that during the formation of these layers there was present more luxuriant vegetation than during the formation of the red layers.

SOME SNAILS OF THE GUNNISON NATIONAL FOREST.

J. Teague Self, *Omega.*

During the summer of 1934, while attending the summer research station at Gothic, Colorado, a collection of snails was made from the Gunnison National Forest. The altitude at which the collections were made ranged from 9500 ft. at the station to as much as 12,400 ft. at the top of the nearby mountain peaks. Twelve species of snails were taken. Five of these were generally distributed over the alpine range. One variety was taken only at the top of Virginia Peak at an altitude of 12,400 ft. Snails were not found in great abundance, but it is interesting that they were taken in the several types of habitats, even from the barren mountain tops where the most severe weather conditions exist.

A NEW SPECIMEN OF SYMBOS FROM CHICKASHA, OKLAHOMA.

J. Teague Self and J. Willis Stovall, *Omega.*

This is a new report of Symbos in Oklahoma. The specimen consists of a skull fragment taken from a Pleistocene sand pit near Chickasha. It is of importance because it extends the possible range of this animal essentially one degree south and three degrees west.

DUSTING AS A NEW MEANS OF CONTROL OF THE HOP APHIS.

Noel P. Larson, *Alpha Mu.*

Oregon is the nation's biggest hopyard. The annual value of the hop crop in that state is over $3,000,000.

The hop aphis (*Phorodon humuli* (Schr.)) is at times very destructive to hops. Two years ago it caused a loss of over one-sixth of the crop.

In the past quassia and soap have been widely used to combat the aphid; more recently nicotine and soap have been employed, but growers are not entirely satisfied with the latter. The former is very variable and altogether indefinite in its effectiveness.

Two years ago nicotine-lime dusts were introduced. Field experiments have shown a 10% nicotine-lime dust to be quite effective against the aphis and considerably cheaper. Besides this, the dust is much easier applied than the spray.

The merits and drawbacks of this new method are discussed.

THE EFFECT OF FAT EXTRACTION ON GOLGI BODIES OF KIDNEY CELLS OF THE FROG.

Herbert L. Eastlick, *Iota.*

Frog kidney, when fixed in 4% formalin and subsequently treated with Kolatchev solutions, is found to contain osmiophilic bodies which not only appear identical to the Golgi substance of Kolatchev fixed controls but which also resist bleaching in hydrogen peroxide or potassium permanganate solutions. If a formalin fixed kidney is dehydrated and extracted with various fat solvents and subsequently fixed with the Kolatchev technique, the Golgi bodies are usually completely removed but occasionally cells are found which contain spherical globules of osmiophilic substance scattered through the cytoplasm.

Kidney tissue fixed in a mixture of 95 parts of alcohol plus 5 parts of formalin before the application of the Kolatchev solutions does not contain Golgi bodies. The same results are obtained if benzene is used instead of alcohol and formalin. Striated muscle, when treated in a similar manner contains darkly stained (Z) and (M) membranes. The osmiophilic substance present in muscle, therefore, is quite widely different, chemically and physically from that contained in kidney cells.

It is apparently an established fact that formalin preserves phospholipids in tissues and this investigation has shown that Golgi bodies in kidney cells can be demonstrated following fixation in formalin. Moreover, the Golgi bodies, which are preserved by formalin, can be removed by extracting the tissue with fat solvents. This evidence, therefore, strengthens the hypothesis that true Golgi substance is phospholipid in nature.

SOME DIFFERENCES IN BEHAVIOR OF SPECIES OF *ACMAEA* ESCHSCHOLTZ.

Avery Ransome Grant, *Mu.*

A consideration of the significance of behavior traits exhibited by certain species of the limpets of the genus *Acmaea* (*A. pelta, A. scutum, A. fenestrata, A. persona, A. ochracea, A. insessa, A. paleacea, A. depicta, A. asmi*), such as choice of food, method of feeding, time of perambulation, choice of resting site, type of phototropism (if any), and reaction to ebb and flow of tide, with regard to their value as specific traits, and to their possible role in the evolution of the species. The traits under consideration appear to be well differentiated amongst the species of *Acmaea* discussed in the paper, correlating with structural differences nicely.

Further, it is possible that these behavior differences indicate the method of isolation of each group from its closely related kin which permitted the evolution of the present day species all within a small and limited zone (the intertidal zone) from an ancestral group by ecological segregation of forms with limited survival possibilities. It is otherwise almost impossible to explain the evolution of those closely related species within a practically similar geographical range of limited extent.

The behavior differences described being found to be constant within the morphological species, but widely divergent between the different species, and showing a high correlation with the structural features of each species, could account for the speciation and consequent success of the different species all within this limited zone in an identical geographic range.

THE CALORIGENIC ACTION OF PROTEINS.

Avis D. Johnson, *Mu.*

An apparatus for the determination of gaseous metabolism of small animals with which one can measure heat production for an interval as short as 10 minutes is described. Basals as low as 615-635 Calories per square meter of surface area per 24 hours have been determined on 300-350 gram rats.

The effect of type of protein, nutritional condition of the animal and the time relationships between maximum calorigenic effect in the metabolism of protein were investigated.

A MICROSCOPICAL STUDY OF THE POWDERED VEGETABLE DRUGS IN THE UNITED STATES PHARMACOPOEIA.

E. P. Claus, *Alpha Epsilon.*

Since powdered vegetable drugs are indispensable to medicine, it is necessary that the pharmacist be certain not only of the quantity but also of the quality of the drugs he is dispensing. To determine the purity and strength of plant drugs, chemicals, and pharmaceuticals, he refers to the United States Pharmacopoeia which is the recognized book of standards. If the plant drugs are in the entire state, he can readily detect impurities; but if they are reduced to the powdered state, his task is more difficult.

The Pharmacopoeia, in describing plant materials, allows a small percentage of foreign matter to be present. The pharmacist must be capable of determining whether his drug has impurities within the limitations stated, in which case, his material corresponds to the official description; or whether the percentage of impurities is above the limits set, in which case, his material is considered adulterated. Adulterations in vegetable drugs are of two kinds: intentional, and unintentional or accidental. Whether foreign material has been included by unscrupulous or inexperienced collectors is not so much the problem of the pharmacist as is his recognition of the adulterated drugs.

A knowledge of the internal anatomy of plants is necessary to detect adulteration of powdered drugs. The presence of certain histological elements in one powder may be natural, but if they were in another powder, they would indicate impurities. Barks, stems, woods, roots, rhizomes, leaves, seeds, and fruits constitute the major parts of plants used in medicine. Each part in its natural state contains diagnostic histological tissues which are distinguishing measures. In the powdered state, any relationship in these tissues is completely destroyed. The cells are separated, and in many cases, crushed and broken into fragments. Therefore, the examiner must be capable of recognizing not only the various tissues but also the characteristic individual cells. Upon this knowledge and upon the standards stated in the United States Pharmacopoeia are based the pharmacist's determinations of powdered vegetable drugs.

A key for the identification of powdered drugs has been devised which is based mainly upon the histological characters. In this key, the first distinction is into lignified and non-lignified tissues. The lignified tissue is divided into the various plant parts. The non-lignified tissue which constitutes the latter part of the key includes some drugs which have few or no vegetable tissues. At the present time the writer is continuing his study of powdered drugs contained in the forthcoming revision of the Pharmacopoeia.

THE FORMATION OF THE NUCLEAR CLEFT IN THE MACRONUCLEUS OF UROLEPTUS MOBILIS.

M. J. Greene, *Alpha Kappa.*

In each macronucleus at the onset of division there appear large chromatin like bodies in the nucleoplesm. They are not chromatin according to Dr. Calkins as they stain with the acid component of the Borrel and disappear entirely with the Feulgen Treatment even tho they stain like chromatin with the iron haematoxylin. These X bodies are more likely waste products resulting from catabolic activity. They act like catalyzers and provide the stimulus for reorganization of the macronucleus, for a large one or an aggregate take a position at one pole of the nucleus, usually the anterior. It is in this region that the nuclear cleft is developed.

The remainder of X bodies together with the less densely staining chromatin (about ⅓) are disposed of in the cytoplasm which receives them as fragments. By this means useless products of nuclear activity are removed.

The formation of the nuclear cleft, the effect of its presence, and its subsequent disappearance are the first stages in the rejuvenescense of the macronucleus.

The nuclear cleft is significant in the longevity of the organism. It is the first evidence of reorganization of old nucleoplasm into new. This fact can be clearly demonstrated in Euplotes or Aspidisca where the nuclear cleft does not result in the elimination of chromatin but in marked physical and chemical changes of the chromatin itself.

In Uroleptus the formation of the nuclear cleft results in fragmentation of the macronucleus, whereby the macronucleus is purified. This is an important factor in the explanation of longevity for the old material has been reorganized into new. There is a reversal back to the fundamental organization which results in restoring vitality to its optimum. Therefore coupled with this renewal of vitality, there is new life with new activity.

INDUCED OVULATION AN ARTIFICIAL FERTILIZATION IN THE FROG.

Robert Rugh, *Alpha Kappa.*

The relationship of the anterior pituitary to sexual maturity has been demonstrated by homoplastic implants in every major group of vertebrates. Various effects from precocious sexual maturity to induced ovulation have been reported throughout the animal kingdom. The purpose of this paper is to summarize briefly the work on the Amphibea and to present considerable new evidence as to the quantitative factor involved and a dependable technique for induced ovulation and artificial fertilization in the frog, Rana pipiens.

A PREPUBERTAL REVERSAL OF THE SEX DIFFERENCE IN THE GONADOTROPIC HORMONE CONTENT OF THE PITUITARY GLAND OF THE RAT.

HELEN M. CLARK, *Alpha Kappa.*

This paper shows that the hormonal content of the anterior pituitary is influenced by sex and age. In the experiments cited, ages usually were not definitely stated and direct comparisons with the same method of assay were not made between animals of different ages in both sexes. Therefore a series of assays were undertaken of the pituitaries from a large number of donors of both sexes and of known ages, using the immature mouse as the test animal—a form which is very sensitive to gonadotropic hormone.

A PRELIMINARY SURVEY OF A SUB-MARGINAL TROUT STREAM IN LOWER MICHIGAN.

W. F. MOROFSKY, *Theta.*

The study of Augusta Creek, now classified as a sub-marginal trout stream, was studied before any form of stream management was inaugurated. A fish census, a survey of the flora and fauna and a study of environmental conditions, both qualitative and quantitative, were made.

ALGAE OF THE STATE OF KANSAS.

RUFUS H. THOMPSON, *Kappa.*

This is a taxonomic study of the algal flora of Kansas, primarily of the eastern portion of the state. Besides the classification of the algae, notes have been taken on the habitat, pH of the cultural medium in the field, and temperature of the medium, to determine the correlation of these factors with the seasonal rise and decline of the algal flora, and with the reproduction of the algae.

STUDIES ON MEXICAN LIZARDS.

HOBART M. SMITH, KAPPA.

The author has spent several summers in Mexico on collecting trips. The object of these trips has been to make collections of Mexican lizards and to make observations on them in their native habitats.

The collections that have been made are being worked over and the results up to the present time have been published in several articles, some of which are as follows:

Descriptions of New Lizards of the Genus *Sceloporus* from Mexico and Southern United States. Transactions Kansas Academy of Science.

Notes on Some Lizards of the Genus *Phrynosoma* from Mexico. Transactions Kansas Academy of Science, Vol. 37, 1934.

Notes on Some Mexican Lizards of the Genus *Holbrookia*, with the Description of a New Species. University of Kansas Science Bulletin, Vol. XXII, No. 8, 1935.

Miscellaneous Notes on Mexican Lizards. University of Kansas Science Bulletin, Vol. XXII, No. 6, 1935.

Descriptions of New Species of Lizards from Mexico of the Genus *Uta*, with Notes on Other Mexican Species. University of Kansas Science Bulletin, Vol. XXII, No. 7, 1935.

EFFECTS OF X-RAYS UPON THE SNOWY TREE CRICKET.

EDITH BEACH, *Kappa.*

X-rays cause a suppression of cell division in tissues rayed 7-10 minutes.

Irradiation causes fragmentation in the two large V-spermatogonia. One break occurs at the apex (fiber attachment), and the other breaks slightly distal to the apex.

In the late telophase of the last spermatogonial division, the chromonema is more clearly discernable, suggesting that X-rays may affect the chromatin surrounding the gene-bearing material. The earliest evidence of breaks occur during the diplotene stage in the first spermatocyte division. Fragmentation and translocations occur causing many primary spermatocyte chromosomes of unusual shapes and sizes. During late diakinesis, formation of multiples is common.

Second spermatocyte cells following irradiation, show that there is an unequal division of chromatin during anaphase.

The large V-chromosomes were affected most, suggesting that these elements were formed by a fusion of two rod-chromosomes or a rod and a J.

Irradiation of adults reduced the number of eggs laid and the number of nymphs to emerge about one-half.

In the history of the two large ring-tetrads, no unravelling stage was found. The pachytene stage seemed to form out of the prochromosome stage. No evidence for chiasmatype was found.

Aberrations occurred in cells rayed 10 to 12 days previous to fixation. Since cells would pass through several stages of mitosis during this period, it would seem that affects of the rays would be delayed as far as cytological evidence is concerned.

OBSERVATIONS ON PARAMECIUM DURING EXPOSURE TO SUB-ZERO TEMPERATURE.

CHARLES WOLFSON, *Kappa*.

Employing the fact that water enclosed in a capillary tube has been cooled to —19°C. without freezing, Paramecia in their original aqueous medium were exposed to sub-zero temperatures in a simple apparatus which allowed for continuous microscopic observation of the organism during the process of cooling. Some individuals continued in motion at a temperature as low as —14.2°C. As regards survival, one individual recovered from exposure to a temperature of —16°C. Preliminary data indicate a mass resistance to low temperatures, i.e., relatively few individuals succumbed when many were exposed together to given low temperatures in a single capillary tube.

A MONOGRAPHIC REVISION OF THE GENUS *LISTRONOTUS* (COLEOPTERA: CURCULIONIDAE).

LYMAN S. HENDERSON, *Kappa*.

The genus *Listronotus* occurs only in North America, most of the species being found in the United States, and a few in Mexico and Canada.

These beetles are exceedingly variable in such external characteristics as size, color, and sculpture. For this reason the species are difficult to separate, and it is almost impossible to determine some of them by the use of external characters. In view of this fact a study of the genus was undertaken to see if new characters could not be found. It was discovered that the structure of the genital segments of both the male and the female are constant within the species, and that they exhibit specific differences. This paper attempts to build up a system of classification based upon the internal genitalia.

The genus as it now stands contains thirty-two species. Several very interesting cases of synonymy have been discovered, the original errors having been due to the unusual variations of the species. The corrections are based on a study of the genitalia. All the present species will be redescribed and about ten new species will be added. The significant genital structures of both sexes of all the species will be figured. All available distribution records will be given.

The material studied includes specimens from the author's collection, from the Francis Huntington Snow Entomological Collection at the University of Kansas, and about 2,000 specimens, the entire lot of the genus *Listronotus*, from the United States National Museum at Washington, D. C. Several other collections will be studied before the work is concluded.

A PRELIMINARY REPORT OF STUDIES MADE ON THE CHUB OF THE GREAT BASIN (TIGAMA ATRATIA GIRARD) AND ITS COMPETITIVE RELATIONS WITH TROUT.

W. F. CARBINE, *Alpha Lambda*.

Breeding habits and food habits of the Chub are discussed with respect to the Chub's environmental relation with trout. The author cites first-hand evidence as well as other writers as proof of his contention that the Chub is detrimental to young trout, especially as a competitor for food and space.

PARASITES OF FISHES FROM GLACIER NATIONAL PARK.

Ival V. Goslin, *Alpha Lambda.*

This work constitutes an elementary survey of the parasitized fish in Glacier National Park with respect to the location of the parasites in the bodies of the hosts. Twenty-two bodies of water and 11 species of fish were studied. A preliminary statement pertaining to the identification of several Helminth parasites is also included.

TECHNIQUE FOR PREPARING MICROSCOPIC SECTIONS OF WOODY STEMS.

W. W. Newby and Perry Plummer, *Alpha Lambda.*

This article fully and adequately explains a newly-developed method for mounting microscopic sections of stems and roots of *hard, woody, desert* trees and shrubs. All items involved in making these microscopic slides for study, such as: Preparation of the stem, sectioning, staining, and mounting are discussed.

THE LIFE HISTORY OF THE THICK-BILLED RED-WINGED BLACKBIRD (AGELAIUS PHOENICEOUS FORTIS RIDGEWAY) IN UTAH.

Jean Hulme Linford, *Alpha Lambda.*

A description of the Utah bird is given together with its breeding habits, and behavior characteristics. The latter part of the paper comprises tabulations of the foods utilized by large numbers of the birds from October till May, thus showing the different food trends.

FIELD CHARACTERISTICS OF UTAH BIRDS.

Minnie Elizabeth Hansen, *Alpha Lambda.*

The purpose of this paper is to suggest the best means of distinguishing the larger groups of birds from each other. It is written in terminology easily understood by the layman or by high school students having a very limited scientific vocabulary.

PYCNOGONIDS FROM PUGET SOUND.

Harriet I. Exline, *Alpha Theta.*

A report of five species of Pycnogonids dredged in Puget Sound, three of which are new species.

NOTES ON *MICROCOTYLE SEBASTIS* GOTO FROM PUGET SOUND.

Kelshaw Bonham, *Alpha Theta.*

An abundance of material made possible a more detailed examination and portrayal of this trematode ectoparasite of the Rock Cod than had previously been accomplished. Special attention is devoted to the posterior suckers, the oesophagal connections, and to the primary yolk ducts.

TITLE: SYNCOELIUM FILIFERUM (SARS) FROM THE SALMON.

Lowell C. Lloyd, *Alpha Theta.*

Syncoelium filiferum (Sars) a digenetic trematode from the gills of the salmon is described. It is identified as the adult of the immature stage found by Sars in Schizopods from the Challenger Expedition and described as Distomum filiferum.

AN INEXPENSIVE SYNTHETIC MEDIUM FOR GROWING MYCOBACTERIUM TUBERCULOSIS.

Sam Cheu Wong, *Alpha Theta.*

A modification of Henley and LeDuc's synthetic medium is presented. The advantages of the medium over that of Long's asparagine medium are as follows: (1) About the same weight of organisms may be obtained in approximately half the time usually required. (2) An equivalent amount of tuberculin can be obtained in about half the time. (3) The cost of production is approximately one-third that of Long's asparagine medium.

AN INEXPENSIVE GLYCEROL-FREE SYNTHETIC MEDIUM FOR GROWING MYCOBACTERIUM TUBERCULOSIS.

Sam Cheu Wong, *Alpha Theta.*

This is a preliminary report of growing successfully 2 human strains and 2 non-pathogens on a medium employing glucose as a substitute for glycerol. Maximum growth of the 2 human strains was obtained in about 5 to 6 weeks. The method of preparation of the medium, various selected phases of metabolism of the organism, H37, and the nature of the tuberculin obtained are discussed.

A DETERMINATION OF THE HYDROGEN ION CONCENTRATION PRODUCED BY SOME MEMBERS OF THE GENUS MYCOBACTERIUM WHEN GROWN IN WONG'S SYNTHETIC MEDIUM.

DORIS HIRSCHMANN, *Alpha. Theta.*

The purpose of this experiment was to compare the hydrogen ion concentration produced by some members of the genus Mycobacterium when grown on Wong's Synthetic Media containing: (a) glycerine; (b) glucose and (c) glycerine and glucose. The organisms used were: Mycobacterium tuberculosis H 37, Mycobacterium tuberculosis H 1721, Mycobacterium smegmatis, and Mycobacterium phlei. The results indicate a terminal alkalinity was reached for the organisms studied when either glycerine or glucose was added to the above medium.

THE DISTRIBUTION OF MARINE BACTERIA IN THE PUGET SOUND AREA.

B. S. HENRY and ROSE OSTROFF, *Alpha Theta.*

The number of bacteria in sea water, both adjacent to land and one hundred miles from shore has been determined. In the latter region very few organisms are detected but some occur at least to a depth of 2,000 meters. Adjacent to land the number may be as high as 10,000 per cubic centimeter of sea water. This large number is due primarily to pollution from land.

Other than contamination from this source, the chief factors influencing the abundance of bacteria are the occurrence of marine plants, from which bacteria obtain necessary materials, and the extent to which the bottom is agitated.

Studies are being carried on with bacteria isolated from the various types of water with the hope that the role of these forms in the changes which are known to occur in the sea may be understood.

TWO WOOD BORING MOLLUSKS OF PUGET SOUND.

ROBERT C. MILLER, DAN T. HELMS, and J. CLIFFORD STICKNEY, *Alpha Theta.*

Two species of wood boring mollusks occur in the Puget Sound region. The most abundant of these is *Bankia setacea,* the northwest shipworm, which is very destructive to untreated timber in salt water. The other species *Xylophaga washingtona,* is comparatively rare and does no particular damage, being found chiefly in water-soaked pieces of wood dredged up from the bottom. Although of little commercial importance, *Xylophaga* is extremely interesting from the morphological standpoint because of its intermediate position between a highly aberrant form such as *Bankia,* and more typical lamellibranchs. Evidence is presented that both species digest cellulose and thus obtain nourishment from the wood in which they bore.

THE AGONINI OF WASHINGTON.

BARBARA GRAY and MELVILLE H. HATCH, *Alpha Theta.*

The Agonini constitute a tribe of the Carabidae and are here equivalent to the Platynini of Leng, the Archomenini of Bradley, 1930, and the subtribe Agoni of Csiki.

The report consists of a checklist and keys based on collections of Hatch, M. C. Lane, and O. B. Johnson. It includes two species of Calathus Bon., one species of Pristodactyla Dej., one species of Laemostenus Bon., and 13 subgenera and 33 species of Agonum Bon.

Two new species of Rhadine and one of Europhilus are described. Platynus (Paragonum) belleri Hatch (Pan-P. Ent. IX, 1933) is put into a new subgenus, in consideration of the fact that pubescence of the antennae starts on the third segment.

A diagrammatic drawing of a representative of each species has been made, to show the special characteristics.

THE MYCORRHIZA OF PSEUDOTSUGA TAXIFOLIA.

Charles Harrison, *Alpha Theta.*

The occurrence of mycorrhizal rootlets on Pseudotsuga is discussed. These rootlets are shortened, thickened and excessively branched, usually with a more or less compact mycelial sheath around them. This is especially true of trees on a humus-rich soil like rotted wood or peat, where there is also usually a sheath about the whole cluster of rootlets. In sections the fungus is seen to have penetrated more or less deeply between the cortical cells and isolated them.

Root clusters `dipped in alcohol which was then evaporated or burnt off were placed on agar slants and gave rise to cultures of Chaetomium globosum and an undescribed species of Humarina. A bit of the sheath of a root cluster from a tree in Esperance Bog was teased out with sterile needles and placed on an agar slant. The resulting culture was a species of Scopularia Preuss.

Using the nutrient solution recommended by Melin an attempt was made to synthesize mycorrhiza from sterile Douglas' fir seedlings and fungi. The culture chamber consisted of a 2.5 x 25 cm. test tube with sand in the bottom almost up to a cotton-plugged opening in its side. The reservoir was a test tube of the same size drawn down near its mouth and sealed to a straight piece of glass tubing pushed through a rubber stopper in the top of the culture chamber nearly to the bottom. This kept the sand moist with nutrient solution.

A 68 day old seedling inoculated with Humarina showed neither root sheath nor hypertrophy 70 days later. Seedlings in tubes contaminated by Penicillium promptly died. A 153 day old seedling inoculated with Scopularia in 70 days developed a root sheath but no hypertrophy. In cross section the mycelium could be seen surrounding epidermal cells. Epidermal and outer cortical cells also showed invasion by the mycelium. Scopularia was recovered in pure culture from this tube. A control seedling remained sterile.

THE DIATOMS OF A FEW TYPICAL MISSOURI SPRINGS.

Robert Baxter, *Iota Chapter, Washington University, St. Louis, Mo.*

The Bacillarieae or Diatomae of a few typical Missouri springs includes a fair representation of most of the fresh-water families and genera found in the United States. *Navicula* is the most common genus, being represented by more than twenty species. A few of the most common of which are: *N. rhyncocephala* Kutz., *N. radiosa* Kg., *N. elegans* W. S. and *N. longa* Ralfs. The Nitzschiaceae is represented by *Nitzschia* and by *Hantzschia.* The latter genus seems to be the more prominent, *H. elongata Grun.* being a common species found in the majority of springs from which material was taken. Other typical Pennales found are: *Synedra ulna* W.S., *Synedra danica* K.B., *Cocconeis placentula* Ehrb., *Meridian circulare* Ag., *Eunotia lunaris* Ehrb., *Rhoecosphenia curvata* Grun. *and Gomphonema acuminatum* Behr.

Melosira varians Ag. is by far the most commonly collected of the Centrales, while *Cyclotella Meneghiniana* Kg., a solitary free-floating form, was found but rarely.

One undetermined form collected from some springs about twenty miles west of St. Louis, Mo. (on the Rankin Estate,) which resembles the genus *Cocconeis* in shape and in the fact that it possesses a conspicuous pseudoraphe, differs in having the punctae arranged in definite rows parallel to the pseudoraphe, the other species of *Cocconeis* have transverse rows of punctae lateral to the pseudoraphe.

We need fight. Students should be willing to go to any extreme—even to getting kicked out of school—if they actually believe in something.—Professor Ernest Lauer, *Northwestern University.*

EDITORIALS

In the Public Eye

PHI SIGMA has no particularly aggressive ambitions for a place in the scientific sun. If we only succeed in doing our work, accomplishing our purpose, as effectively as possible, we should be satisfied. When the accomplishment of that purpose, or the doing of that work happens, as inevitably it must, to bring our society into the public eye, we may perhaps be forgiven for a few sophomoric twinges of fraternal satisfaction. However, let us not be misled into taking the accidental publicity for the end and purpose of our organized existence. The scientific profession has not been conspiculously noted for reticence regarding its accomplishment, and the notice it has received has had at least one good effect in stimulating the successful to renewed effort, and others to follow their example. Let the publicity that has come to us energize our members to further accomplishments. Much has been the attention focussed on Dr. Causey through his paper read at our convention banquet. It was released through SCIENCE SERVICE to the papers of the nation. Later it appeared in a full page spread in the same organization's "Every Week Magazine Page" release,—with suitable illustrations. Finally it was publicized in an article containing extensive excerpts in "SCIENCE NEWS LETTER. But Dr. Causey was not the only Phi Sigma who was noticed. National releases went out from SCIENCE SERVICE on the convention papers of Fred Barkley (Iota) on poison ivy, H. Katznelson (Alpha Theta) on legume bacteria bacteriophages, W. F. Carbine (Alpha Lambda) on trout destruction by use of live bait, Omer C. Stewart (Mu) on Indian diets, and Clifford Bedford (Mu) on a copper sulphate tolerant fungus. Articles also appeared in the SCIENCE NEWS LETTER on the Phi Sigma convention papers of R. E. Bellamy (Sigma) on northern insects in Florida ravines, H. Knatelson's paper, as well as those of O. C. Stewart, W. F. Carbine, and C. L. Bedford. The BIOLOGIST,too, has come in for its share of publicity. Our book reviews are being quoted by the Cambridge University Press, by Macmillan and by the Williams and Wilkins publishing concerns in their publicity campaigns. The most recent issue of WHAT THE COLLEGES ARE DOING, interesting trade paper of Ginn and

Company saw fit to reproduce a large portion of our last issue editorial "Of Broadmindedness."

We Change

THIS is the last issue of the BIOLOGIST to appear in the usual six by nine inch make-up. Volume number eighteen next Fall will appear in a new, and we hope, even more attractive guise. By so changing a very considerable amount of production costs can be eliminated. More frequent and regular issues will be an added possibility, since there will be much more opportunity to attract a desirable advertising trade and thereby make further reductions in the Society's burden of paying entirely for each issue of the periodical.

Perhaps it is not the place of a mere Editor to dream dreams and to see visions,—but we have long dreamed of an eight and a half by eleven inch magazine,—about the size of TIME, NATION or THE NEW REPUBLIC. Such a format would permit the use of practically all sizes of available cuts for illustrative purposes. It would also cut a more prepossessing figure in the periodical racks in our libraries, instead of, as now, being lost beside,—or behind,—its more attractive neighbors.

Now will be the time for every good man to come to the aid of his party and raise a terrible howl about this inconsiderate change. Thanks. We have been considering this change for a mere three years or more,—it took nearly that long to convince the Council that Canals on Mars wouldn't erode if such a change were made. Also we promised on many genteel oaths that if any howls were made by the indignant membership over such a change they would suffer the ignominious fate of reverberating in our editorial eustachians alone. So howl on, brethren!

The BIOLOGIST has long been the apple of our editorial eye. We like to keep our apples polished and on display, thereby we gratify our grosser, yet not altogether unesthetic senses. If this little periodical were not that apple, but a nut, any shell would do to hide its kernel from the squirrels of the society. We still swear by all the gods at once that the BIOLOGIST is not a nut.—Not yet.

Your Chapter News

YOUR Editor's periodical convention report again stressed the necessity for regular and complete news-letters. To all of which the chosen and duly qualified delegates did solemnly assent. Furthermore, it was decided that our future policy would not be to send air mail or telegraphic requests to the chapter officers for their news-letters. Instead the Editor was authorized to have post cards printed and mailed to each Chapter Secretary in time to bring in the chapter reports. All of which has been done exactly as ordered. The cards were printed, bearing the following message: "On.................................. the next issue of THE BIOLOGIST goes to press. On or before that date all your chapter news, alumni notes and lists of recent initiations should be in our hands. We will appreciate it if your material is double-spaced typewritten, but this is not essential. Cut or illustrations of persons, buildings, etc., mentioned in your reports will always be welcome. We cannot use photographs."

With this message we naturally felt that a healthy response would ensue. Look the News-Letters over. See if you can answer the question in our mind: "Why?"

Future Conventions

AS a result of the deluge of papers which occurred at our St. Louis Convention, it occurs to the editor that it might be well for us to reorganize our procedure somewhat. Certainly the long list of reports was the most impressive in the history of the society. Also certainly it must have surprised many a puzzled reader of the A.A.A.S. convention program. And, most certainly has it also given rise to some very definite feelings of resentment against Phi Sigma for stealing the show from the anthropological, botanical, ecological and zoological societies. There is no question that having our papers read in a stuffy hotel room instead of out at a Washington University prevented many a professor and other interested persons from hearing our contributions; but who could have foreseen the length of our program, on the one hand, or the needlessly jumbled convention arrangements perpetrated on the A.A.A.S. by the St. Louis convention committee.

Perhaps some system should be worked out in advance,—and ruthlessly followed by the National Council,—of having the right to enter certain of our contributed papers in the various national scientific society programs, and reserve for the Phi Sigma program the work of the manifestly more junior scientists. Just as much, if not more, good would be accomplished. Our members would have their papers brought to the attention of a wider group, and the main purpose of our scientific program would be as effectively attained. As the old Romans used to say: "Variis modis bene fit."

CHAPTER NEWS LETTERS

Alpha

(Inactive) c/o Dr. A. E. Waller, Botany Department, Ohio State University, Columbus, Ohio.

Beta

President—Wayne W. Whitaker, Zoology Department, Univ. of Michigan, Ann Arbor, Michigan.

Vice-President—Irving Cantrall, Univ. Museums Bldg., Ann Arbor, Mich.

Secretary—Lois Jotter, Botany Dept., Univ. of Mich., Ann Arbor, Mich.

Treasurer—William Stickel, Zoology Dept., Univ. of Mich., Ann Arbor, Mich.

Beta Chapter of Phi Sigma resumed its activities for the year October 16, 1935, when Dr. Henry van der Schalie, Assistant Curator of Mollusks of the Museum of Zoology, University of Michigan gave an interesting account of his travels in Guatemala the previous spring with Dr. Carl L. Hubbs, Curator of Fishes, Museum of Zoology, University of Michigan. The expedition was one of a series sponsored by the Carnegie Institution of Washington for the biological study of Guatemala as a background for the work on the Mayan civilization now being carried on by the Carnegie Institution. As a continuation of the general topic of Guatemala, Dr. Josselyn Van Tyne, Curator of Birds of the Museum of Zoology, University of Michigan spoke November 20, 1935 on the contributions of the Carnegie Institution's 1931 Expedition to our knowledge of the ornithology of Guatemala.

On December 4, 1935, Dr. Lee R. Dice, Curator of Mammals of the Museum of Zoology, University of Michigan spoke on "*Hybridization* in *Peromyscus*". Dr. Dice introduced his subject by a discussion of the significance of sexual reproduction and went on to discuss the fertility relationships in plants and animals, especially in the deer mice of the genus *Peromyscus.*

Members of Beta Chapter were treated to a very interesting and informative talk December 18, 1935, by Mr. Volney H. Jones, ethnobotanist in the Museum of Anthropology, University of Michigan. Mr. Jones spoke on "Indian Agriculture" outlining the invention of agriculture and its various developments among the Indian tribes of the Americas.

The regular winter initiation of Beta Chapter was held January 8, 1936. Dr. Carl L. Hubbs, Curator of Fishes of the Museum of Zoology, University of Michigan spoke on "The Fishes of the Western Desert". His talk dealt with the present distribution of fish in the waterholes and streams of the West in the light of knowledge as to the past history of those waterholes as relicts of extensive lakes.

Following Dr. Hubbs' interesting talk, initiation of 19 new members took place.

James H. Wood, taxidermist and preparator for the Museum of Zoology gave an illustrated lecture on the history and development of taxidermy from embalming by the Egyptians to modern procedure. Following the lecture, a special election was held to fill the vacancy left by the resignation of President James B. Griffin who is absent this semester on a tour of eastern museums. T. P. Haines was elected president and Burton T. Ostenson was elected vice president to fill the vacancy left by Mr. Haines' assuming the duties of president.

William M. Clay, ex-president of Beta Chapter and our delegate to the National convention, in his excellent report of the meetings stressed the need for expansion of the organization with maintenance of high requirements for membership. The second half of the evening was turned over to the recent initiates who provided a program of fun and entertainment.

Wesley Curran on March 4, 1936 presented some interesting facts concerning his travels of the past year in Brazil in connection with the work of the Fisheries Institute of Brazil, outlining the social and economic conditions of the people as well as his actual work on the fishes.

Dr. A. A. Christman of the Biological Chemistry Department, University of Michigan told the members and guests of Beta Chapter at an open meeting, March 18, 1936, some very illuminating and timely facts concerning the biological effects of carbon monoxide poisoning. He presented statistics on the lethal concentration of the gas with air and also some of the symptoms experienced by the victims.

Following this speech the spring election of new members was held. Actual initiation has not yet taken place at time of writing.

Plans are now being completed by this chapter to establish a loan fund of $100 available to members of Phi Sigma Society for graduate work at the University of Michigan Biological Station, Douglas Lake, Michigan. The money would be available in the form of a loan of $50 per year to any deserving member of the Phi Sigma Society doing graduate work at the Biological Station.

With the consistent attendance of the interesting meetings by the old members and the enthusiastic response of recent initiates, Beta Chapter looks forward to the happy culmination of a highly successful year.

INITIATES

Ammann, George Andrew
Cantrall, Irving James
Clark, Hugh Daniel
Cleverdon, David White
Grassl, Carl Otto
Harris, Joseph Pollard, Jr.
Hinnshaw, Thomas Doane
Kretschmer, Jane
Kruidenier, Francis
Leonard, Justin
Liu, Pearl Mei-Chu
Lundahl, Walter Schauman
Matson, Frederick Rognald, Jr.
Muyskens, Florence Douwina
Oliver, James Arthur
Quimby, George Irving
Richardson, Raymond Gregg
Rottschafer, Gerald
Smith, Helen Vandervort
Trautman, Milton Bernhard
Wallace, Harold Edward

BURTON T. OSTENSON,
Vice President, Beta Chapter.

Delta

Ruth C. Harding, 162 College Road, Orono, Maine.

Epsilon

President—Wayne Kraxberger, 2041 South Josephine St., Denver, Colorado.
Vice-President—Harland Close, 2050 So. Gaylord, Denver, Colorado.
Secretary—Carol Cox, 869 So. Race St., Denver, Colorado.
Treasurer—Theodore Sowers, 2438 Harlan Blvd., Edgewater, Colorado.

Zeta

President—S. S. Atwood, Biology Bldg., Univ. of Wisconsin, Madison, Wisconsin.
Vice-President—C. A. Bundle, Biology Bldg., Univ. of Wisconsin, Madison, Wisconsin.
Corresponding Secretary—G. E. Gould, Biology Bldg., Univ. of Wisconsin, Madison, Wisconsin.

Recording Secretary—O. A. Bushnell, Agric. Hall, Univ. of Wisconsin, Madison, Wisconsin.
Treasurer—H. R. Bird, Agric. Chem. Bldg., Univ. of Wisconsin, Madison, Wisconsin.
Editor—A. E. Zermuehlen, Old Soils Bldg., Univ. of Wisconsin, Madison, Wisconsin.

Our present program committee has been very successful in obtaining speakers of note. The first big occasion however was at the banquet, Dec. 19. This was held in the Memorial Union; our toastmaster was B. P. Domogalla, and the speaker-guest of the evening was Prof. Aldo Leopold of the Agric. Economics Dep't. Prof. Leopold had recently returned from Germany, and his talk had the title "Deer and Forestry in Germany"; slides from his photographs were shown.

You will probably be interested in a sketch of the other open meetings. A new policy has been adopted regarding these meetings; many of the faculty members having biological interests are invited to attend, and there has been encouraging response. It cannot be the refreshments which attract—but the hall is always crowded.

Dr. I. L. Baldwin spoke on "Oxidation-Reduction Potentials in Relation to Biological Activities".

Dr. W. J. Meek—"Physiological Background of Heart Diseases". At this meeting also a movie was shown—"Development of the Heart and Embryonic Circulatory System in the Chick".

Dr. M. F. Guyer—"Cancer Research". At this meeting another movie was shown—"Normal and Cancer Tissue Cultures".

Dr. B. M. Duggar—"Plant Viruses" (illustrated).

Dr. R. R. Shrock—"Nature and Formation of Fossils". (With demonstration specimens).

Dr. N. P. Neal—"Hybrid Corn Breeding in Wis." (illustrated and with demonstrations).

Our alumni notes are quite incomplete but I shall include what we have:

Past president H. M. Clarke is in Texas.

F. W. Tinney has a position with the U.S.D.A. in connection with the Agronomy Dep't. here.

D. C. Matthews is father of twins.

W. H. Schaefer is teaching in a college in Salem, West Va.

H. M. Field is teaching at Milton College, Milton, Wis.

A. D. Hasler is on the Atlantic Coast in Gov't Oyster research.

S. X. Cross is now with the U.S.D.A., B.A.I. in Beltsville, Md.

M. L. Hayes is now teaching at the Univ. Milwaukee Extension Division.

A. B. Chapman has a young daughter.

A. J. Keenan is now connected with the Whiting Dairy Co. of Boston, Mass.

R. Hayman is a chemist for the Wis. Alumni Research Foundation.

O. L. Kline is with the Food and Drug Admin., Wash., D. C.

C. D. Gordon is Poultry Research Associate at the Alabama Polytecnic Inst.

The following persons were initiated into Zeta Chapter, December 19, 1935:

Bushnell, Oswald Andrew
Fogelberg, Sidney Otto
Laidlaw, Harry Hyde, Jr.
Maaske, Clarence Alfred
Schloemer, Clarence Louis
Sjolander, Newell Oscar
Swanson, Arthur Martin
Wagner, Fred Christopher
Waletzky, Emanuel
Wing, Leonard William
Zermuehlen, Alfred E.

W. F. Hollander, *Zeta Editor.*

Eta

President—**Oliver Musser, 256 Dayton Place, Akron, Ohio.**
Vice-President—**Sanford Rosenman, 54 Aqueduct Street, Akron, Ohio.**
Secretary—**Beatrice Toharsky, 425 Willow Street, Akron, Ohio.**
Treasurer—**Solomon Miller, 1013 Delia Avenue, Akron, Ohio.**

Eta chapter received a very favorable report of the National Convention held last January in St. Louis. Mr. Van Sickle gave a detailed description of his experiences at the convention and conveyed to us the idea that it was very worth while. Suggestions and proposals made in St. Louis were approved by the chapter.

Eta chapter has held three open meetings this year. Prominent people in the city spoke at these. Dr. Way, leading allergist in Akron enlightened us to a great extent on the subject of Allergies. Dr. Gordon spoke on "Social Diseases" and Dr. Bliss of the Edwin Shaw Sanitorium spoke on "Problems of Tuberculosis." At our next open meeting faculty members of the University of Akron are to report on outstanding bits of research done in their departments. At our biweekly meetings talks have been given by active members on such subjects as "New Advancements in Microdissection," "Etiology of Blood Cells" "Present Theories of Chromosomal Movement in Mitosis and Meiosis."

An initiation was held at the home of Professor Fox for two new members, Mr. Eckert and Miss Gerson. Mr. Eckert has been doing a comparative study of the urogenital systems in vertebrates. Miss Gerson has written a paper on "Tests and Stains in Isolating and Identifying Microorganisms." Following the initiation ritual, the evening was spent in informal discussion. Seven people now engaged in research, are under consideration for next spring's initiation.

Eta chapter has received favorable news of her alumni. Dorothy Schneider, who received a scholarship at Ohio State University last spring is engaged there in botanical research. Mr. John Hall is working for his Master's degree at the same university. Mr. George Van Doros is doing very well in medical school in Pennsylvania.

Of our active members three are assistants in the various departments. Mr. Van Sickle is graduate assistant in the Zoology department. He is also engaged in the preparing of whole transparent specimens. He is applying the slide clearing technique to whole animals. Mr. Rosenman is assistant in the Physiology department. He is busy with the study of the comparative rates of tryptic digestion in the case of paramecia previously subjected to varying external conditions. Mr. Miller is assistant in the Bacteriology department. He, together with our president, Mr. Musser are experimenting with Pneumothorax in Tubercular Dogs. They are working under the guidance of Dr. Bliss.

Mr. Glenny is working both in the field of Anatomy and in the field of botany. In the former he is making a study of the brain of Heteroperca incisor, with reference to the cranial nerves and their location and attachment to the brain. In the latter field he is studying the distribution of Oscillatoria on the cliffs of the Cuyahogua River.

Eta chapter is interested in the work and progress of other chapters and would be very happy to hear from any of them.

The following persons were initiated into Eta Chapter March 6, 1936:

Eckert, Joseph John
Gerson, Grace

BEATRICE TOHARSKY, *Secretary.*

Theta

President—L. P. Anderson, Bacteriology Dept., Mich. State College, East Lansing, Mich.
Vice-President—Nathan K. Ellis, Soils Dept., Mich. State College, East Lansing, Mich.
Secretary—J. R. Stiefel, Physiology Dept., Mich. State College, East Lansing, Mich.
Treasurer—Wm. Smith, Horticulture Dept., Mich. State College, East Lansing, Mich.

Iota

President—Chester Nunn, Theta Xi House, Washington University, St. Louis, Mo.
Vice-President—Anne Perley, McMillan Hall, Washington University, St. Louis, Mo.
Secretary—Helen Bramsch, 5112 Wabada Ave., St. Louis, Mo.
Treasurer—Mary Bowen, 5879 Julian Ave., St. Louis, Mo.

Iota has thus far enjoyed a very successful year. In December twenty-two new members were initiated at a hilarious banquet. Rev. Dr. Reynolds, paleontologist from St. Louis University, was the speaker of the evening. He told of his experiences collecting in the wilds of New Mexico where he has found what may be the fossil of the earliest mammal. Those initiated were: Esther Allen, Henry Andrews, Henry Barnett, Robert Baxter, Harvey Bingham, Betty Bohannon, Mary Jane Brownback, Gordon Davis, James Foerster, Elisabeth Ham, Ralph Hervey, Elinor Kohn, Henry McQuade, Ruth Norine, Ruth Peck, Howard Petzold, Willard Rowland, Russell Seibert, David Waugh, Lillian Willson, Max Wittmann, and Robert Young. Recently more new members have been elected for initiation in April.

At our meetings we have been fortunate in obtaining very interesting speakers. Dr. Edgar Anderson of the Botany Department gave an illustrated talk on botanical institutions in the Balkans. He had had many amusing experiences during his visits there. Mr. Phil Rau, entomologist spoke on the evolution of social and solitary forms in bees and wasps. Dr. Victor Hamburger, embryologist of the Zoology Department, who worked for eleven years with Dr. Spemann, Nobel Prize winner, discussed his work in experimental embryology on Salamander eggs; the lecture was illustrated with lantern slides. At the last meeting Father Reynolds of St. Louis University, who has been elected a member of our chapter, talked on the Peleocene fossils that he has collected in northwestern New Mexico. His talk was accompanied by motion pictures of the expedition, including the pet lion who was the mascot. The Rev. Dr. A. M. Schwitalla of St. Louis has been elected to honorary membership.

The following persons were initiated into Iota Chapter, December 4, 1935:

Allen, Esther Campbell
Andrews, Henry Nathaniel, Jr.
Barnett, Henry Lewis
Baxter, Robert Wilson
Bingham, Harvey Dexter
Bohannon, Betty LaVere
Brownback, Mary Jane
Davis, Gordon William
Foerster, James Motz
Ham, Elisabeth Claude
Hervey, Ralpha Johnston
Kohn, Elinor Catharine
McQuade, Henry A.
Norine, Ruth Adelaide
Peck, Ruth Elizabeth
Petzold, Howard Vernon
Rowland, Willard Daniel
Seibert, Russell J.
Waugh, David F.
Willson, Lillian Moore
Wittmann, Max Lauenborg
Young, Robert Helm

HELEN M. BRAMSCH, *Secretary.*

Kappa

President—Lewis Coriell, Dept. of Bacteriology, Univ. of Kansas, Lawrence, Kansas.

Vice-President—Charles Wolfson, Dept. of Zoology, Univ. of Kansas, Lawrence, Kansas.

Secretary—Rufus Thompson, Dept. of Botany, Univ. of Kansas, Lawrence, Kansas.

Treasurer—Allan Jay, Dept. of Bacteriology, Univ. of Kansas, Lawrence, Kansas.

Lambda

President—George D. Scott, 339 So. 5th St. E., Missoula, Montana.

Vice-President—William H. Trosper, 405 So. 3rd St., W., Missoula, Montana.

Secretary—Terrill D. Stevens, 913 Beckwith Avenue, Missoula, Montana.

Treasurer—Helena L. Eck, 539 University Avenue, Missoula, Montana.

Dr. George Finlay Simmons
New President of Montana State
University.

Shortly after school opened last fall the club took a hike in the Blackfoot Valley for the purpose of studying the flora and fauna of the season. The zoologists and botanists reported their findings to the group and each member gave his comments. After the brief hike we returned to our bonfire site for supper. We enjoyed the trip so much that we intend to have objective hikes often.

December 12 we shall initiate twelve pledges: Phil Smith, Terrill Stevens, Julian Dominick, Agnes Jensen, Wood Goble, Joseph Linduska, Richard Ormsbee, Walter Custer, William Trosper, Richard Varney, Helen Eck, and Robert Rurhewein. We plan to hold formal initiation in the Natural Science Building and afterward drive to the Happy Bungalow for a dinner-dance.

The President, Lillian Hopkins, resigned her office which was succeeded by the Vice President Royal Turley. Thomas Brierly was elected Vice President.

Representing Lambda Chapter at National Convention this year will be Royal Turley. He will present a paper on "Some Observations on the Ecological Distribution of Certain Trees in the North Fork River Region of Glacier National Park." Mr. Turley made these observations during the past summer in his work (as assistant to assistant to Technician, botanist, and sample plot man collecting data for the vegetative type map of the forests in Glacier park) or timber type mapping. George Scott was elected alternate.

In June 1935, Kenneth Ivar Rhude, past treasurer of Lambda, received a scholarship in the Heidelberg Medical School of Heidelberg University in Germany. His scholarship is for ten months, however, he intends to complete his medical course there.

WANLYN JOHNSON,
by M. A. BROME.

There is considerable news to be reported from Lambda chapter this spring that has come to pass during last fall and winter and so far this spring.

We have held meetings twice a month through the year so far when major campus dates did not conflict.

Speakers have been:

Dr. C. H. Stevens—veterinarian—Infectious Abortion of Cattle.

A paper by Lambda's president.

Dr. Charles Deiss—geology—Fossils and Oil-Bearing Strata.

Dr. Leon Richards—-pharmacy—Plant Chemistry and Forest Fire Resistance.

Dr. J. W. Severy—botany—Enzymes.

Several speakers are already scheduled to talk during the spring quarter and we hope to have some spring outings in Missoula's encircling mountains when weather becomes less wintry.

Initiation of twelve new members December 12, 1935 was carried out by the thirteen old members and six professors present. Those initiated were:

Walter Custer—Biology
Julian Dominek—Forestry
Helena Eck—Biology
Wood Goble—Pharmacy
Agnes Jensen—Botany
Joe Linduska—Biology
Richard Ormsbee—Biology
Robert Ruehrwein—Pre-Medic
Charles Schramm—Forestry
Phil Smith—Biology
Terrill Stevens—Forestry
William Trosper—Forestry

Lambda chapter's alumni are many and their activities widely varied. Last year's president, Edward Dobrinz, is with the Forest Service on range management work; Joel Frykman is timber typing for Uncle Sam; and Joe Wagner, our secretary two years ago, is in Santa Fe, New Mexico in charge of 430,000 acres of grazing land where he and his twenty helpers are determining range capacities. Paul Lemmon, '30, received his doctorate degree last summer at the University of Wisconsin in Plant Physiology. He is now at Pullman, Washington with the Soil Conservation Service. Virginia Graybeal, '35, is translating recent French publications on Botouneuse fever for Dr. R. R. Parker, Special Expert, U. S. P.H., in charge of the Rocky Mountain Spotted Fever Laboratories at Hamilton in the Bitter Root Mountains. Kenneth Rhude, '35, received a ten-month scholarship at Heidelberg, Germany and has been there studying medicine since last June.

A high light of this spring's news letter concerns a recent initiate, Dr. George Finlay Simmons, who was initiated as a faculty member of Lambda chapter January 15, 1935 became president of Montana State University last month. Governor Elmer Holt inaugurated Dr. Simmons February 16, the University's Charter Day, and the address was given by Dr. Carl Moore of the University of Chicago, nationally known zoologist under whom Dr. Simmons studied.

Dr. C. L. Hitchcock, of the botany department, is preparing a manuscript on the species of the genus *Lepidium* of the United States. He is recognizing twenty-five species with numerous varieties, his conclusions as the result of two years' study.

Dr. Leon Richards, pharmacy, has been carrying on a preliminary survey concerning the possibilities of utilizing plant chemistry analyses in forecasting "fire readiness" in the fight against forest fires. An effort is being made to use the conditions of the vegetative materials in the field, as determined by chemical analyses, as an index for fire danger. It is hoped that the correlation of this material with the factors now being utilized by the Forest Service will permit even more accurate forecasting of fire conditions in the nation's forests.

Dr. C. W. Waters, Professor of Botany and Forest Pathology, has completed a series of studies extending over a period of five years on the effects of certain types of logging and burning in the control of the White Pine Blister Rust. These studies have been carried on in connection with the western office of the Division of Blister Rust Control. It is hoped that the results of these studies will appear shortly in the form of a technical bulletin of the United States Department of Agriculture. In addition, Dr. Waters is bringing to completion some studies on the longevity and viability of seeds naturally stored in the forest floor of the forests in Northern Idaho.

R. A. Ormsbee has been working for the U. S. Public Health under Prof. R. A. Cooley, of the Rocky Mt. Spotted Fever Laboratories, who is publishing a monograph on North American species of the genus *Dermacentor*.

He has been making extensive measurements of body parts of all North American species with a view towards the construction of a supplementary biometrical classification key. This work will aid in the more definite separation or consolidation of species.

Phi Sigma, I notice, has received some free publicity by Dr. Frank Thone who writes for Science Service. His review of Dr. David Causey's paper, *The Decadence of the Male in the Animal Kingdom,* given at the society's convention banquet in St. Louis appeared in a recent newspaper issue but, after reading the review, I cannot say it conveyed the original wit and humor of the real paper, which, everyone who heard it will agree, was most interesting. I hope Dr. Causey's paper will appear in the BIOLOGIST so that all of Phi Sigma's members as well as those delegates to the recent convention, can enjoy it in the original. Dr. Thone writes that "the Phi Sigs are of the younger generation of scientists, so that they are able to relish a spice of fun on the solid meat of their learning."

Everyone of this chapter is anxiously awaiting the new BIOLOGIST which will contain, no doubt, the National Council's report of the last convention and abstracts of almost ninety papers presented there. Dr. Keefe has a job this time, a larger one than before, because the number of papers has increased so much.

As delegate from Lambda Chapter and as the Chapter letter scribe, I want to greet again the other delegates and convey cordial wishes from Lambda to all the other Chapters and the National Council.

ROYAL TURLEY, *President.*

AMERICAN INDIAN STUDIES

Dr. G. A. Matson of the bacteriology department has been studying blood groups of the Blackfeet and Blood tribes of American Indians and has found a different percentage distribution of some of the groups than any other Indians studied until now. Group A appeared to have the same preponderance among these tribes as group O does among other tribes of Indians. These findings suggested that "Blackfeet" and "Bloods" did not separate from the rest of the human family before the A agglutinogen developed in the race.

So much at variance with the blood group distribution found previously among Indians is the distribution among the "Blackfeet" and "Blood" tribes, that a more complete study including tribes contiguous to the "Blackfeet" should be of value. Such a study, which takes into account not only the blood group characters, A and B, but other hereditary factors found in the blood, designated as M and N, and which are demonstrable by serological means, is now in progress among the Blackfeet and Flathead tribes." Jour. Immunol. 1933 25, 155.

Lambda chapter letter scribe,
ROYAL TURLEY.

Mu

President—Thomas G. Aitken, 112 Agric. Hall, U. C., Berkeley, Calif.
Vice-President—Robert L. Kitchel, 112 Agric. Hall, U. C., Berkeley, Calif.
Treasurer—Kathryn Heck, 2444 Virginia St., Berkeley, Calif.
Secretary—Dorothy C. Morrell, 2045 L. S. B., U. C., Berkeley, Calif.

Spring semester activities of Mu chapter started practically with the first class of the school term, thanks to an energetic president, and have continued at a pace that keeps a large membership ever ready for more. A habit now well established of having refreshments a part of every meeting in one way or another has doubtless had its influence.

The opening meeting was a dinner at the Alpha Tau Omega fraternity house. Datus Hammond, graduate student in Zoology and delegate to the National Convention at St. Louis, reported back to the chapter. He was followed by Dr. Agnes Fay Morgan, chairman of the Household Science department, who attended the International Congress of Physiologists in Russia last summer. Her talk revolved largely around eating and drinking.

The policy of having a member give a brief talk on his or her own research at the beginning of a meeting has been extended to include the work of undergraduates as well as graduates when possible.

Mid-semester activity reached a peak in the initiation banquet held March 10. Lillian Halstrom responded for the initiates. The speaker, Dr. I. M. Thompson, chairman of the anatomy department, thoroughly confounded the assembled biologists with an address on "The Biology of W. S. Gilbert". None present had realized the wealth of biological data to be found in the works of the co-author of the Gilbert and Sullivan operas. The toastmaster, Dr. Eric Ogden professor of physiology, scrupulously refrained from giving him away.

New members are: Harold W. Bischoff, Aileen E. Bonestell, Minor M. Cordry, Mary I. Essig, George M. Foster, Jr., Eldon J. Gardner, Lillian I. Halstrom, Beryl O. Schreiber, Jean Shearer, Robert E. Smith, Ruth E. Taylor, Frederick H. Test, William M. Upholt, John Wilkinson, George A. Zentmyer, Jr. Departments represented are: Anthropology, Bacteriology, Botany, Entomology, Household Science, Plant Pathology, Psychology, and Zoology.

After unanimously voting against two measures that entailed financial outlay, a free radio dance was enthusiastically supported. It was held "Friday the Thirteenth" at the Alpha Tau Omega fraternity house, again through the courtesy of a member of both Phi Sigma and the fraternity. Remaining activity for the year includes the election of officers.

The following persons were initiated into Mu Chapter, October 30, 1935:

Andrews, Leroy Winfield
Brown, Clarence William
Christensen, Frances Edith
Curts, California June
Doane, Betsy I.
Drake, Grace Emmaline
Gregory, Constance Heath
Haynie, Mary Maltman
Heizer, Robert Fleming
Helsley, Adelyn Louise
Hodgkin, Elizabeth
Kadner, Carl George
Krueger, Albert Paul
Levine, Norman Dion
Lorenz, Louise Frances
McKee, Charles Bradford
McOmie, William Arthur
Ott, Mae Vanette
Pentler, Charles Frederic
Rayner, H. John
Richardson, Elizabeth
Shimkin, Demitri Boris
Smyth, Wilma Louise
Taylor, Frances Eleanor
Tschopik, Harry, Jr.
Whitaker, Bruce Giraud

The following persons were initiated into Mu Chapter, March 10, 1936:

Bischoff, Harold Walter
Bonestell, Aileen Estelle
Cordry, Minor Mae
Essig, Mary Isabel
Foster, George McCelland, Jr.
Gardner, Eldon John
Halstrom, Lillian Irene
Schreiber, Beryl Olive
Shearer, Jean
Smith, Robert Emrie
Taylor, Ruth Elizabeth
Test, Frederick Harold
Upholt, William Martin
Wilkinson, John
Zentmyer, George Aubrey, Jr.

Thomas G. Aitken, *Secretary.*

Nu

President—Jacob Moses, 28 W. Wylie Avenue, Washington, Pennsylvania.

Vice-President—James D. Maxwell, 900 Jefferson Avenue, Washington, Pennsylvania.

Secretary-Treasurer—C. A. Ely, 1010 Jefferson Avenue, Washington, Pennsylvania.

Xi

(Inactive) Elmer Palmatier, Room 210, Bessey Hall, University of Nebraska, Lincoln, Nebraska.

Omicron

(Inactive) c/o Dr. E. A. Baird, Botany Department, University of North Dakota, Grand Forks, N. D.

Pi

President—W. B. Redmond, Box 534, Emory Univ., Georgia.

Vice-President—Heywood Moore, Emory Univ., Georgia.

Secretary—Nelson T. Spratt, Jr., Biology Dept., Emory Univ., Georgia.

Treasurer—Eva Sherwood, c/o Nurses' Home, Emory Univ., Georgia.

The following persons were initiated into Pi Chapter, April 21, 1935.

Marion M. Brooke, Harold E. Wager, Thomas V. Matthews, J. D. McCord, Rosaltha Hagan Sanders.

Rho

President—Ralph W. Dexter, 203 Exp. Zoology Lab., Champaign, Illinois.

Vice-President—Howard L. Gravitt, 101 Exp. Zoology Lab., Champaign, Illinois.

Secretary—Katherine Kinsel, 200 Natural History, Univ. of Ill., Urbana, Illinois.

Sigma

President—J. D. Kilby, Biology Dept., Univ. of Florida, Gainesville, Florida.

Vice-President—A. M. Laessle, Botany Dept., Univ. of Florida, Gainesville, Florida.

Secretary and Treasurer—H. H. Hobbs, Jr., Biology Dept., Univ. of Florida, Gainesville, Florida.

PROGRAMS:

January 13, 1936

Dr. A. S. Pearse, Head of the Biology Department at Duke University—"Rambling Researches."

February 10, 1936

Pharmacy Department in charge of program—Several short talks by members of the Pharmacy School.

March 9, 1936

Dr. R. C. Emerson, Cornell University—"Physical Basis of Heredity" (A joint meeting with Sigma Xi, Entomological Society).

The following persons were initiated into Sigma Chapter, December 13, 1935:

Arnold, Lillian E.
Boyer, Kenneth Franklin
Futch, Merrill Charles
Lundy, Hosea Willis
Maxwell, Lewis Samuel
Norris, Louise
Reese, Jess Allen
Sadler, Glendy Graham
Setzer, John Dimon
Smith, Edward Rousseau
Stirling, Walter William
Stewart, Alban
Webb, Herbert Mitchell

Horton H. Hobbs, Jr., *Secretary.*

Tau

President—J. Woodrow Wilson, Zoology Dept., Duke Univ., Durham, North Carolina.
Vice-President—Randolph Boggess, Botany Department, Duke Univ., Durham, N. C.
Secretary—Sarah Culbreth, Zoology Dept., Duke Univ., Durham, North Carolina.
Treasurer—Wilbur Duncan, Botany Dept., Duke Univ., Durham, North Carolina.

This has been a very active year for Tau chapter. At our first meeting in October, Dr. W. H. Conant, formerly of the Harvard Medical School and now of Duke, gave an illustrated lecture on "Skin Fungi" which was well attended by members of Phi Sigma and the university community.

At the November meeting, the following new members were elected into the organization: W. H. Baisden, Mary Derrickson, K. H. Garren, Ernest Hester, Ray Lanier, Ruth McClean, Robert Peck, Max Rosenblatt, Harvey Savely, C. S. Schopmeyer, T. N. Webb and J. W. Brown. These were initiated at the annual banquet on December 11. Following the banquet, an open meeting was held with Dr. F. G. Hall of the zoology department giving an illustrated lecture entitled ''Ten Men on a Mountain''. Dr. Hall returned in September from a six months trip to the Andes with the International High Altitude Expedition.

The January meeting was taken up by a discussion of ''The Scientific Method'' by Dr. Z. P. Metcalf of North Carolina State College which was most interesting and helpful. F. H. McCutcheon, a member of the society, addressed the February meeting on his own research entitled ''The Function of Haemoglobin In the Life History of the Bullfrog''.

At the meeting of March 17, the following new officers were elected for the year 1936-37: President, Woodrow Wilson; Vice President, Randolph Boggess; Secretary, Sara Culbreth; Treasurer, W. H. Duncan. At this meeting, E. W. Ligon was elected to membership.

Dr. Frederick A. Wolf recently published his book on ''Tobacco Diseases and Decays''. Dr. D. L. Hopkins is on leave of absence this year, spending part of the time in Philadelphia and part in Bermuda, studying protozoa. Dr. A. S. Pearse, head of the zoology department, is also on leave of absence studying the parasites of oysters at Appalachicola Bay, Florida. Willard Wharton, a member of the chapter, is assisting him.

Dr. C. G. Bookhout, a former president of Tau chapter, has returned from Elon College to be an instructor in the zoology department.

We also have with us this year another former member of the chapter, John D. Scott, who is now assistant supervisor of the Sara P. Duke Memorial Garden.

The following persons were initiated into Tau Chapter December 10, 1935:

Boggess, William Randolf
Brown, James Wilson
Derrickson, Mary Burton
Garren, Kenneth Howard
Lanier, Raymond Ray, Jr.
McLean, Ruth Atkinson
Peck, Robert Lawrence
Rosenblatt, Max Barr
Savely, Harvey Epperson, Jr.
Schopmeyer, Clifford Scharff
Webb, Thomas Norfleet

On February 11, 1936, Hester, Ernest Carrington was initiated into Tau Chapter.

Sara Culbreth,
Dwight Billings.

Upsilon

President—Lewis Roth, 116 W. Spring, Oxford, Ohio.
Vice-President—John Duerr, 209 N. Campus, Oxford, Ohio.
Secretary—Ned Linegar, 18 East Spring St., Oxford, Ohio.
Treasurer—Bertha Davison, 600 Stanley, Middleton, Ohio.

The following persons were initiated into Upsilon Chapter, December 5, 1935.

Armacost, Richard Ralph
Ash, Edwin Everett
Biery, Richard Jay
Breneman, William Raymond
Brenneman, Cyrus Emerson
Carr, William David
Crosby, F. Dale
Gilcrest, Carl William
Gorsuch, Milvin Thomas
Hale, Frank Clare
Hake, June Virginia
Hardesty, Hiram H.
Hough, Charles Eugene
Lang, Arch Davidson
McKinney, E. Jane
Otis, John
Skerritt, Edward George
Steed, Mary Helen
Tolley, Mildred Grace
Yoder, Mary Elizabeth
Zipf, Robert E.

Schonwald, John William was initiated into the same chapter January 16, 1936.

The following persons were initiated into Upsilon Chapter, March 19, 1936:

Diver, John Joseph, Gallagher, Clarence Mankopf, Gatch, Hayward David, Jr.

Phi

President—Clyde W. Monroe, 22 Ballad St., Durham, New Hampshire.
Vice-President—Janice Pearsons,
Secretary—Mary Tingley, Horticultural Dept., Univ. of New Hampshire, Durham, New Hampshire.
Treasurer—Genevieve Walker, Scott Hall, Univ. of New Hampshire, Durham, New Hampshire.

Phi Chapter started things off in the spring term of 1935 by electing a live group of officers. To the new officers fell the job of initiating the men and women elected to become new members of Phi Chapter. Pledging took place at an outing to Menden's Pond. Fifteen new members were formally initiated and were present at the initiation banquet.

The spring outing trip was held at the summer camp of an alumni member of Phi Chapter. Nearly everyone climbed the mountain and at the end of the outing voted it one of the best ever.

Phi Chapter's activities do not cease with the end of the school year. Dr. Norman K. Arnold was initiated in August at the end of the summer session of the Marine Biological Laboratory at the Isles of Shoals. Dr. Arnold was a member of the summer school staff and is instructor in Zoology at Dartmouth College during the regular college year.

The annual summer Phi Sigma weekend held at the close of the Isles of Shoals Marine Laboratory session was bigger and better than ever. Here old and new members meet to discuss mutual problems and to enjoy the greatest combination God has given to man,—sunshine and the ocean.

During the summer, brother Philip Wright who is working on his thesis problem under the direction of Professor C. Floyd Jackson, secured a specimen of *Sporophilla lineola,* an accidental visiting species of bird. This, so far as is known, is the first record of this species from New Hampshire.

Following the roll-call meeting in the fall, several meetings were devoted to initiating eleven new members. Nine of these were undergraduates and two were graduate students.

Many interesting papers have been presented at the bi-monthly meetings. Professor Jackson gave a fascinating report of a collecting trip on the north shore of the St. Lawrence. The writer gathered the idea that here is a place well adapted to the ''survival of the fittest''.

Clyde Monroe reviewed an article on the staining of Planaria.

Philip Wright gave an interesting paper on terns.

Ruth Thompson reviewed a paper on prehistoric man.

Louise Clover prepared a summary of her doctorate thesis which was done at Iowa State College on penetration of gaseous nicotine, pyridine and pipeidine into the American cockroach.

Dr. Stewart Dunn of the Botany Department, reviewed the work he had recently completed on the determination of cold hardiness in succulent plants, principally cabbage and Bryophyllum.

Several graduate students have nearly completed their master's theses. Dorothy Calnan is working on the histology of the eyes of the mole—*Parasclops breweri.*

Roger Brassard is working on the histological structure of the gizzard of *Gallus domesticus.*

Maurice Dinnerman is tracing the evolution of the nervous system in Cyclostomes from the standpoint of histology.

Arthur Jorgenson of the Botany Department is determining the spray injury caused by lime sulphur as modified by insecticides such as calcium and lead arsenate and by shading.

Lemuel Wright of the Biological Chemistry Department plans to get his Master's degree in June.

Phi Chapter's loss will be Michigan's gain. Edwin Rasmussen of the Experiment Station staff in Horticulture has resigned to accept a position as Associate Professor of Horticulture at Michigan State College. "Ed" as he is known to all of his associates, has been an outstanding worker in extension and research. His work on the results of five years experiments on the keeping quality of McIntosh, Baldwin, and Cortland apples is in the process of publication.

Dr. Latimer of the Department of Horticulture is making a study of the possible toxicity of sodium ions to strawberries in southern New Hampshire. He is also studying the relation of the position of the blossom in the cluster to growth and other characteristics of the fruit of the McIntosh apple.

Mary Tingley of the Department of Horticulture is working on the subject of macroscopic and microscopic observations on winter injury in the apple tree.

Professor Woodward, head of the Forestry Department, is planning to develop a system of soil classification based on ground color.

The alumni news is unfortunately, rather meager. Word comes to us recently that Philip Allan is the proud father of a son. Phil is doing game conservation work in New York and has his headquarters at Ithaca.

There is a question in the writer's mind just how far a chapter report should go in vital statistics, yet research covers a broad scope.

Herbert Jackson has transferred from Harvard to Cornell to get particular work in mammology for his doctorate.

John Sheehan has started his doctorate work at the University of Iowa.

Lucretia Dodge is acting as practical nurse in an invalids' home.

Robert Paine is now an instructor in the Forestry Department at the University of New Hampshire.

Many of the graduates of last June are now attending medical colleges.

PHILIP WRIGHT.

Chi

President—Fred Parke, Lewis Hall, Bozeman, Montana.
Vice-President—Kathryn Lyon, 310 W. Mendenhall, Bozeman, Montana.
Secretary—Arthur Ferkin, Pi Kappa Alpha, Bozeman, Montana.
Treasurer—Winnifred Boewer, 718 So. Seventh, Bozeman, Montana.

Chi chapter of Phi Sigma recently held election of officers for the ensuing year and so I am sending you the list of new officers. The new President is Margaret Boetcher, Chi Omega house, Bozeman, Montana. The Vice President is Kenneth Bakke, Pi Kappa Alpha House, and the Secretary-Treasurer is Wayne Lenz, Route 2, Bozeman.

As yet we have received no copies of the March issue and I was wondering whether it was through some fault of ours or whether the copies had been lost or misplaced. If they have not yet been sent out through some fault that we can correct, I would greatly appreciate it if you would let me know right away and I will do what I can to correct it.

We enjoy the magazine very much and are looking forward to our next issue.

The following persons were initiated into Chi Chapter:

Miller, Evelyn—May 17, 1935
Alderson, Edwin Franklin—December 6, 1935
Bakke, Kenneth Roy—December 6, 1935
Boetcher, Margaret Anna—December 6, 1935
Clark, Thomas W., Jr.—December 6, 1935
Ernst, Elizabeth Adams—December 6, 1935
Everett, Irene Catherine—December 6, 1935
Hawks, Orris Duran—December 6, 1935
Lenz, Lee Wayne—December 6, 1935
Siess, Charles Albert—December 6, 1935
Spain, Louis A.—December 6, 1935
Turner, Charles Willard—December 6, 1935

MARGARET BOETCHER.

Psi

President—Frederick Johnson, Pharmacy Dept., Bagley Hall, Univ. of Wash., Seattle, Washington.
Vice-President—Robert H. Williams, 312 Johnson Hall, Univ. of Wash., Seattle, Washington.
Secretary—Charles L. Harding, 221 Johnson Hall, Univ. of Wash., Seattle, Washington.
Treasurer—Estelle Kaazin, Pharmacy Dept., Bagley Hall, Univ. of Wash., Seattle, Washington.

The following initiates were initiated into Psi Chapter December 12, 1935:

Acena, Bernado A.
Barnum, Ruth Marion
Coats, Ruth Emily
Doyle, Frank Norbert
Flanagan, George Clemans
Galbraith, James Edward
Hardin, Charles Luther
Koozin, Estella
Minsk, Gertrude
Rising, Louis Wait
Royce, Bertha May
Stone, Clarence Dillon
Tsuchiya, Henry Mitsumasa
Williams, Robert Haworth
Langenham, Henry A.

Omega

President—James Bragg, Zoology Dept., Univ. of Oklahoma, Norman, Okla.
Vice-President—O'Reilly Sandoz, Zoology Dept., Univ. of Oklahoma, Norman, Okla.
Secretary—Wilda Fritts, Botany Dept., Univ. of Oklahoma, Norman, Okla.
Treasurer—Paul Phillips, Zoology Dept., Univ. of Oklahoma, Norman, Okla.

Omega Chapter began the school year as usual with a business meeting to outline the activities of the Chapter for the year. The Chapter has sponsored interesting lectures given by faculty members, students, and visiting Scientists. Outstanding among these were lectures by Mr. Arthur Bragg of the Zoology Department, and by Mr. Donald E. McHenry of the Grand Canyon National Park, Arizona. Mr. Bragg lectured on the Biological aspects of the New England Coast giving descriptions of both animals and plants of the region. Mr. McHenry gave an illustrated lecture in January on the Botanical and Geological features of the Grand Canyon. His slides featured both animals and plants of the Grand Canyon in addition to the Indian culture of that region.

The Initiation Banquet December 18 was one of the highlights in the year's program. Dr. B. D. Barclay of Tulsa University delivered an interesting address on the "Effects of Environment upon Plant Organography, with Evidences from Research Studies." Dr. Richards of the Zoology Department told the Chapter of the proposed Biological Sciences building, the Zoological wing of which will be ready for occupation sometime next fall. Dr. Sears spoke on the meaning of Phi Sigma to its members, emphasizing what an organization like Phi Sigma represents, and the difficulties involved in attaining the goals of the society.

Central points in the business meetings of the year have been discussion of the initiation fees and the fees for active members. There has been the feeling on the part of some members that should these fees be reduced, the local chapter would benefit in increased interest and activity on the part of graduate students in the Departments of Botany and Zoology. It has been suggested by some that the expenses of the local chapter be reduced. Some have questioned the advisibility of sending so much money to the national Treasury for the payment of fares of delegates to the National Convention, realizing of course that any change would have to be enacted by the members of the convention itself. Others feel that fees should be increased if anything is done about the matter. As it now stands, after national fees are sent in little is left to promote lectures and other desirable activities.

It might be of interest to the other chapters of Phi Sigma to know what some of the outstanding members of this chapter are doing. Dr. Harold H. Hefley, formerly of the Zoology Department, is now doing research in Parasitology at the University of Oklahoma Medical School. Mr. Charles Smith and Dr. Ethyl Derrick are now instructing in Biology at Central State Teachers College, Edmond, Oklahoma.

Mr. Frank Hedges left a graduate assistantship in the Department of Zoology January 1 to take a position with the Department of Agriculture at Safford, Arizona. Mr. Hedges had completed work for an M.S. degree which will be granted in June.

Miss Dixie Young is on leave of absense for the second semester to complete her Ph. D. at Yale. Mr. Weldon Brewster, formerly of Texas University, is serving as instructor in Zoology for the second semester, during the absence of Miss Young.

Mr. Paul Phillips, former treasurer of this chapter, is now in the Soil Conservation Service at Gallup, New Mexico.

Richard Carpenter, Rhodes Scholar, reports an interesting and profitable year at Oxford.

Miss Margaret Kaeiser, as Technical Assistant, is making an analysis of fossil pollen from the southwest. A grant from the Carnegie Foundation to the Department of Botany has made possible this effort to date these prehistoric remains. It is probably the first time than an analysis of fossil pollen from an arid climate has been attempted. Miss Kaeiser reports that the pollen is well preserved even though it does not occur in peat deposits.

Dr. Harriet Barclay, formerly of Tulsa, Oklahoma, is helping with the Botanical work the second semester.

Dr. George J. Goodman, Professor of Botany, apparently has the habit when in Rome of burning Roman candles. He insists when in Mexico upon eating encilladas, when visiting the Mississippi River upon eating nothing but catfish, when in Oklahoma upon wearing nothing but cotton clothing, and when he goes to Ames, Iowa as Assistant Professor of Botany and Curator of the Herbarium at Iowa State College, he expects to eat nothing but corn pone. In spite of the limited wardrobe, Dr. Goodman has been able to triple the small collection of about seven thousand herbarium sheets of 1933, has made large collections over the state, particularly in the western part, and has found several species and even genera new to Oklahoma. Dr. Goodman came to the University in the Autumn of 1933 to take charge of the Herbarium and to become instructor in Botany. He came directly from the Missouri Botanical Garden at Saint Louis where he had been doing graduate work. Dr. Goodman will leave for Iowa March 1, 1936.

The following persons were initiated into Omega Chapter, April 18, 1936:

Barclay, Bertram Donald
Barclay, Harriet George
Brewster, Weldon
Cantrell, B. A.
Earlye, LeRoay William
Fishman, Ann
Gould, Lawrence Gary
Hawkins, Mildred Louise
McClure, Coye Willard
Perry, Elinor
Scott, Thomas C.
Shackleford, Martha W.

WILDA FRITTS, *Secreary.*

Alpha Alpha

President—Dr. Harry L. Bauer, Santa Monica Jr. College, Santa Monica, California.
Vice-President—Jack Remple, Univ. of Southern Calif., Los Angeles, Calif.
Corresponding Secretary—Dorothy Nichols, Univ. of Southern Calif., Los Angeles, California.
Recording Secretary—Margaret Willoughby, Univ. of Southern Calif., Los Angeles, California.
Treasurer—Francis Elmore, Univ. of Southern Calif., Los Angeles, Calif.

Alpha Alpha Chapter at the University of Southern California, Los Angeles, held a very successful initiation banquet on Friday evening, February 14, in the Foyer of the new Town and Gown Club House on the University campus. Despite torrential rains, a large number of members and guests were present. One member, Dr. Edith Purer, even braved the downpour to the extent of driving up from San Diego, over a hundred miles (and back the same evening!). Among the distinguished guests were Dr. and Mrs. Dobzhansky, from the California Institute of Technology. The following are the names of the initiates: James Finley, Richard Gardner, Paul Motsinger, Dorothy Nichols, Harry H. Stone, Margaret Simpson, and Frances Marguerite Willoughby.

The feature of the evening was an address by Dr. Went, of the California Institute of Technology, on "The Epiphytic Plants of Java". Dr. Went was formerly associated with the Botanical Gardens in Java, and he illustrated his talk with slides showing parts of the Gardens, as well as various regions of Java in which he carried on his work in research. The audience was much interested in his description of several of the curious symbiotic relationships between epiphytic plants and insects, particularly ants.

In lieu of the April meeting, Alpha Alpha Chapter may take a trip to Death Valley during the Easter Holidays.

The following persons were initiated into Alpha Alpha Chapter, February 14, 1936:

Finley, James Arthur
Gardner, Richard Melvyn
Motsinger, Paul Lester
Nichols, Dorothy Adelle
Simpson, Margaret Ethel
Stone, Harry Horton
Willoughby, Frances Marguerite

NANCY CLARE OTT, *Secretary.*

Alpha Beta

President—Alan Donaldson, A. T. O. House, Mount Union College, Alliance, Ohio.
Vice-President—Gordon Stewart, Sigma Alpha Epsilon House, Mount Union College, Alliance, Ohio.
Corresponding Secretary—Betty Ayers, 2365 S. Arch Ave., Alliance, Ohio.
Recording Secretary—Virginia Quinn, Alpha Xi Delta House, Mount Union College, Alliance, Ohio.
Treasurer—Myron Pardee, 2208 S. Rockhill, Alliance, Ohio.

We have elected to membership this year twenty-five eligible students, in anticipation of the graduation of eighteen seniors this June.

Our President, Howard Hughmanic, has been accepted at Rochester Medical School, where Don Ruch, '35, will also go in the Fall.

William White has been accepted at Harvard Medical School.

Hazel Johnson, '35, has accepted a post at Clifton Springs Sanatorium as Technician.

Mary Fitch, '35, has been working in the laboratories of Alliance City Hospital.

Eugene Ott, '34, has been affiliated with Massilon State Hospital.

Our most outstanding meeting of the year occurred when Dr. Helen Kingsbury Coffin gave an address on psychiatry. Dr. Coffin was the first president of Phi Sigma at Mount Union, and was a graduate of Rochester Medical school. She is at present connected with the mental hospital at Newburg, Ohio. In her talk, she gave an outline of the various mental disorders, and concentrated on the treatments and therapeutics involved. After her talk, there was an informal discussion on the various phases of psychiatry and neuropathology.

We are looking forward to a series of talks by our own members. This will conclude the chapter's work this year.

The following persons were initiated into Alpha Beta Chapter, December 5, 1935:

Andrews, Mabel Rose
Ayers, Martha Elizabeth
Carr, Martha Elma
Pierce, Robert Russell
Quinn, Martha Virginia
Shea, West Lindsey
Shoemaker, Daun Elaine
Stewart, Sinclair Gordan
Weis, John Arthur
Withers, Ruth LaVerne

MARJORIE PATTISON, *Secretary.*

Alpha Gamma

(Inactive) **Albert Fauth, 309 Lewis St., Vermillion, S. D.**

Alpha Delta

President—**Ruth Nelson, 39 Bellaire Ct., Appleton, Wisconsin.**
Vice-President—**Patricia Leek, Russell Sage Hall, Appleton, Wisconsin.**
Secretary—**Doris Boettcher, Route 3, Box 71, Appleton, Wisconsin.**
Treasurer—**Wilson Schier, Delta Tau Delta, Appleton, Wisconsin.**

Alpha Epsilon

President—**Henry Idzkowsky, Dept. of Zoology, Univ. of Pittsburgh, Pittsburgh, Penn.**
Vice-President—**Warren Witz, Dept. of Botany, Univ. of Pittsburgh, Pittsburgh, Penn.**

Secretary—Philip Walker, Dept. of Botany, Univ. of Pittsburgh, Pittsburgh, Penn.
Treasurer—William Starkey, Dept. of Zoology, Univ. of Pittsburgh, Pittsburgh, Penn.

The following persons were initiated into Alpha Epsilon Chapter, March 27, 1936:

- Almaden, Philip Joseph
- Henderson, Lee Warren, Jr.
- Finn, James Bernard
- Keil, John Henry, Jr.
- Piper, Wendell Doran
- Reed, Eleanore
- Schmidt, Edward C. H.
- Shinn, Lawrence Ellsworth
- Waite, Knighton Van Buren
- Wakeman, Gabrielle Bonne
- Wallace, George Egbert, Jr.

Alpha Zeta

President—Eugene Barclay, Pi Kappa Alpha House, William and Mary College, Williamsburg, Virginia.
Vice-President—Frederic Eidsness, Sigma Alpha Epsilon House, Williamsburg, Virginia.
Secretary—Elizabeth Jones, Pi Beta Phi House, William and Mary College, Williamsburg, Virginia.
Treasurer—Carol Gouldman, Pi Beta Phi House, Williamsburg, Virginia.

Alpha Zeta of Phi Sigma announces its initiates with much pleasure. Dr. Roy Ash, Anne Abel, Robert Bosman, D. R. Driscoll, George Glenn, Winston Hainsworth, John Rogers Mapp, Joseph Redford, Edward Temple, Bernice Shield, Clarence Ward, and Doris Van Dien. Dr. Ash is the most recent addition to the faculty of the Dept. of Biology. He completed his undergraduate work at Marietta College in 1930, took his M.A. at Brown University in 1932. He completed his thesis for his Ph.D. at Brown University in 1935.

At present, the chapter is hard at work preparing and sponsoring the Biological Stunt Night which we hope will both interest and benefit students in other fields of concentration. At the bi-monthly meetings we have had several interesting programs.

Dr. Raymond Taylor, professor of Botany, gave a report on the Virginia Academy of Science meeting held in Charlottesville.

Dr. Walter A. Chipman, U.S. Bureau of Fisheries, lectured on the ''Toxicity of Salts on Marine Life''.

George Glenn presented a paper on ''Oyster Borers'' based on his experimental work done last summer at Yorktown, Va.

Dr. Ash gave an account of some work he had done and the "Effect of concentrations of Guinea Pig Sperm on the Toxicity of Guinea Pig serum for Guinea Pig Sperm."

The entire chapter wishes to express appreciation for the "Biologist". It is a grand little magazine and we are proud if it.

ELIZABETH JONES, *Secretary.*

Alpha Eta

President—Mr. Marion Spore, 713 College, Stillwater, Oklahoma.
Vice-President—Alvin Kenworthy, Horticulture Dept., Okla. A. & M. College, Stillwater, Oklahoma.
Secretary and Treasurer—Willie Frederick, 713 College, Stillwater, Okla.

The following persons were initiated into Alpha Eta Chapter, January 22, 1936:

Abernathy, Clorinne Francis
Beall, Forrest Wade
Easterling, Ruth Eva
Harkins, Charles Edward
Kenworthy, Alvin Lawrence
McLean, Lawrence Gordon
McMillen, Warren Newton
Moe, Harold Merton
Perrin, Ida Louise
Sykora, Charles Joe
Tolmatchoff, Nicholas Matthew
Frederick, Willie J.

Alpha Theta

President—Harley English, College Station, Pullman, Washington.
Vice-President—Lewis Allison, Elmhurst Apts., Pullman, Washington.
Secretary—Wilma Hudleson, 309 Dilke Street, Pullman, Washington.
Treasurer—Harry Katznelson, 706 Campus, Pullman, Washington.

With each new issue the "Biologist" is becoming more interesting, and Alpha Theta looks forward to receiving its copies. It is the only organ through which we can contact the other chapters, and we feel that it is very worthwhile.

Alpha Theta chapter of Phi Sigma now boasts of 31 people as their largest group of active members. At the fall initiation 16 promising neophytes were accepted into membership. The initiation banquet was held at the Washington Hotel, after which Dr. Hungerford, head of the Agriculture department of the University of Idaho at Moscow, spoke on "Plant Virus."

One of the important projects of Alpha Theta is the sponsoring of a club, known as the "Natural History Club", open to students, faculty and townspeople in order to present to the public topics of natural history. Talks by faculty members and by graduate students, illustrated with lantern slides, are featured at each meeting. A special item on the program for this spring is a four-day field excursion to the upper and southern regions of the Snake River. Faculty members from the science departments will accompany the group and will give pertinent facts concerning the country or flora as it is explored. Phi Sigma feels that sponsoring this club is a worthwhile project, and finds that it is highly popular among the students, and townspeople.

Three of Alpha Theta's members are receiving their Master's degrees this spring—Lewis Allison, Sanford Anderson, and Harry Katznelson. Mr. Pin Ling Hsu, one of our former members, was granted his master's degree last fall, and is at present employed with the *Institute of Wheat and Rice Improvement* in Nanking, China.

Extending our greetings to the other chapters of Phi Sigma.

The following persons were initiated into Alpha Theta Chapter, January 11, 1936:

Cantrall, Emmett Wesley
Claus, Robert T.
Cooil, Bruce James
Edwards, Glenn Dwight
Heyer, John William
Hilding, Raymond L.
Koutz, Fleetwood Raymond
Kramer, Paul R.
McMurry, Frank Bailey
Mittelstaedt, Stanley G.
Moore, E. Roger
Moree, Ray
Sackett, Jotham Hall
Smith, Laurel George
Vollmer, William E., Jr.
Williams, George Agusta

WILMA HUDLESON, *Secretary.*

Alpha Iota

President—Kenneth Herrold, St. Catherine Street, Lewisburg, Pa.
Vice-President—Thomas Fagley, (home) 122 N. Oak St., Mt. Carmel, Pa. (school) Tau Omega Omicron House, Lewisburg, Pa.
Secretary-Treasurer—Elizabeth Byerly (home) 3001 N. 3rd St., Harrisburg, Pa. (school) Women's College, Lewisburg, Pa.

Alpha Iota Chapter has just ended a very interesting and active semester. We have extended bids to a large number of pledges, all of whom are working on their own research problem.

Alpha Iota has been very fortunate to have some very fine lectures. Dr. L. R. Legault, a new member of our faculty, professor of biological chemistry, presented a very interesting lecture on the subject of "The Active Principle of Ergot". Dr. Ross K. Childerhose of Devitt's Camp, as the second visiting speaker, gave an illustrated lecture on the "Importance of Student Health and Tuberculosis".

The second semester has begun with great activity in the field of research and some students have already presented their papers. Some of the most unusual examples of research were found in the works of Mr. Kolodny and Mr. Clemens and Miss Millikin. Mr. Maxwell H. Kolodny presented a fine paper on the subject—"Effects of Radial Emanations from the Human Skin upon Bacteria." Miss Jane Millikin presented a fine paper entitled, "A Study of the Effect of Endocrine Extracts upon Bacterial Growth". Mr. Wm. B. Clemens presented a very interesting and very different piece of work, "Survey of Health of Bucknell Students". An abstraction of which we are including for use if you desire to include it in the next issue.

On February 24 we initiated into Alpha Iota two new members both of whom are deeply interested in research. The initiates were Mr. Wm. B. Clemens and Mr. Maxwell H. Kolodny.

We thought maybe you would like to know that Miss Mary Ellen Noll '34 is a laboratory technician in Mayo Clinic, Rochester, Minnesota.

Charles L. Spurr '35 is at Rochester Medical School.

Wm. Bogar '34 is at Harvard Medical School.

Well I believe that is all the news for this time.

Initiates—February 24, 1936: Clemens, William Bryson, Kolodny, Maxwell Howard.

KATHRYN E. BYERLY, *Secretary.*

Alpha Kappa

President—Ethel Poris, 1555 Inwood Ave., Bronx, N. Y.
Secretary—Alwin Winstein, 1456 Wilkins Ave., Bronx, N. Y.
Treasurer—Mildred Schweiger, 64 Jesup Place, N. Y. C.
Recording Secretary—Fanny S. Black (no address).

The following persons were initiated into Alpha Kappa Chapter, January 31, 1936:

Brush, Ruth M.
Harvey, Anna Lydia
Ormsby, Louise
Ruhl, Elisabeth Henrietta
Schutz, Sylvia
Sielke, Dorothy Hammond
Smith, Charlotte
Steedman, Elsie Viault
Sternberg, Mildred
Weishaar, Irma Ruth
Welsh, Dorothy Marie
Wetstein, Ethel
Aldinger, Lenore

Alpha Lambda

President—Perry Plummer, Dept. of Botany, Univ. of Utah, Salt Lake City, Utah.

Vice-President—Francis Flaim, Dept. of Zoology, Univ. of Utah, Salt Lake City, Utah.

Secretary—Lily Meldrum, Dept. of Bacteriology, Univ. of Utah, Salt Lake City, Utah.

Treasurer—Dilworth Marchant, Dept. of Zoology, Univ. of Utah, Salt Lake City, Utah.

The following persons were initiated into Alpha Lambda Chapter, March 7, 1936:

Andrus, Owen E.
Bangerter, Rowena
Bassett, Clyde Gordon
Daines, Lyman G.
Evans, Frederick Read
Fernandez, Leabert Roberts
Flaim, Francis Richard
Holmgren, Arthur Herman
Jones, Daniel Merrell
Kearns, Grant Franklin
Kearns, Owen Austin
Rice, Helena Marie
Richins, Calvin A.
Stenburg, Margaret
Stephens, Fayette Ellsworth
Wheatlake, Ruth Joy

Alpha Mu

President—Bud Crowell, Sigma Phi Epsilon, Oregon State College, Corvallis, Oregon.

Vice-President—Man Parrott, Zoology Dept., Oregon State College, Corvallis, Oregon.

Treasurer—Tom Taylor, Theta Chi, Corvallis, Oregon; (home) 1014 Adams, Olympia, Washington.

Alpha Nu

President—Marion Rohovec, Alpha Delta Pi House, Univ. of New Mex., Albuquerque, New Mexico.
Vice-President—Elizabeth Hardway, Girls' Dormitory, Univ. of New Mex., Albuquerque, New Mexico.
Secretary—Margaret Boles, Kappa Kappa Gamma House, Univ. of New Mexico, Albuquerque, New Mexico.
Treasurer—Rilla Brink, Girls' Dormitory, Univ. of New Mex., Albuquerque, New Mexico.

Alpha Nu Chapter had the honor of having Dr. Cornelius De Villiers, Head of the Department of Zoology, University of Stellenbosch, South Africa lecture on the Biology of South Africa at the first meeting of the year.

The Chapter decided to give a prize of ten dollars each year for the best biological paper presented at Phi Sigma meetings. The contestants are restricted to members of Phi Sigma and research papers covering work done on the Master's Degree are not considered in the awarding of the prize. The best paper is to be determined by a committee of three Biology Faculty members and two active members of Phi Sigma.

At the next meeting, Dr. Castetter, Head of the Department of Biology, at the University of New Mexico, related the history and development of the Biology Department in this institution during the past seven years. His talk was interesting to all, and most of the members were surprised and pleased at the progress the department has made in this time.

Other papers presented during the first semester were on "Insulin" by Avis Johnson and a paper on "Physiologic Role of Inorganic Salts in Plants and Animals" which was read by Milburn Tharp at the December meeting.

Miss Avis Johnson, our delegate to the National Convention reported on the many phases of the convention—such as the general aspects, the business meetings, and the Constitutional changes. Avis enjoyed her stay at the Convention so well that many of us wish we could have attended.

Initiation was held January 16 at Sara Raynolds Hall for Portz Bretney and Edward LeMoncheck, student members; Bright Greiner and Frank Hibben, graduate members; and for Kenneth W. Simons, faculty member. The initiation banquet was held at the University Dining Hall, Dr. Donald D. Brand, Head of the Department of Anthropology and Archaeology gave a very interesting address on the origin of some of our domestic plants and covered in a very thorough manner the history of their introduction into North America.

On February 6, James Stewart presented a paper on "Diabetes", and on February 20, a paper on the "Relation between physical features and criminality" was given by Garth Blakely. Group discussion followed both papers.

At a recent meeting Ann DeHuff talked on the "Modern Attitude toward the Problems of Eugenics".

Marvin Rohovec reported on a part of the research he has done toward his Master's Thesis on the subject of "Vegetational Changes in the Rio Grande Valley as the result of Drainage."

Alpha Nu Chapter plans the initiation of new members and election of officers in the near future.

The following persons were initiated into Alpha Nu Chapter April 17, 1936:

Boles, Margaret
Brink, Rilla Cabeen
Brown, Cora Rose
Chaney, Mary Martiel
Dolzadelli, John Pete
Downing, Tom Ivan
Goforth, Helen Margaret
Hardway, Elizabeth Estelle
Jarboe, Norma Fidelis
Markham, Allen Morgan
Menaul, Rebecca Jane
Mudgett, Zadah Loulita
Rohovec, Marion Estell
Tharp, Milburn Kenneth

The following people were initiated into Alpha Nu Chapter on January 16, 1936:

Bretney, Portz
Greiner, Bright Elsworth
Hibben, Frank Cummings
LeMoncheck, Edward
Simons, Kenneth Walter

RUSH M. BROCK, *Secretary.*

Alpha Xi

President—Theresa Matorese, Chi Omega House, Rhode Island State College, Kingston, Rhode Island.

Vice-President—Samuel Eisenstadt, Zoology Dept., Rhode Island State College, Kingston, Rhode Island.

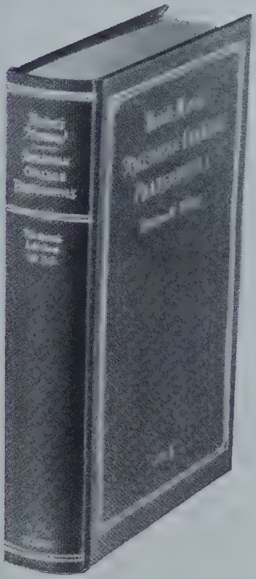
Secretary—Barbara Haley, Chi Omega House, Rhode Island State College, Kingston, Rhode Island.

Treasurer—Harry Brownell, Phi Mu Delta House, Rhode Island State College, Kingston, Rhode Island.

The following people were initiated into Alpha Xi Chapter, November 14, 1935:

Birch, Eleanor Hazard
Bonjour, Jeanne Juliette
Bucci, Anthony
Callaghan, Joseph Matthew
Gilbert, Basil Elijah
Odland, Theodore Eugene
Parker, Sydney Sanford
Rosen, Banton Harold
Russell, Charles Edward
Thompson, George Alfred, Jr.
Salomon, Milton
Tureo, Vincent Joseph
Wolfe, Henry Benjamin

A. I. Ortenburger.



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BOOK REVIEWS

Reviews printed here represent the candid opinions of various readers, not necessarily those of the members of the National Council, nor even those of the Editor.

HEADLINERS

Esteemed by the reviewer as outstanding.

ANATOMY OF THE RAT, Eunice Chace Green; *American Philosophical Society, 104 South Fifth St., Philadelphia, 1935. $5.00.*

Three hundred and thirty nine illustrations, many in three colors, an extensive bibliography, and three hundred and seventy pages of well-printed text comprise this most necessary volume which should be on hand in any laboratory where the white rat, (Mus norvegicus albinus), is used for experimental purposes. The price is reasonable enough to warrant its wide sale.

ATLAS OF HUMAN ANATOMY, Williams, Frohse, Broedel and Schlossberg; *Barnes & Noble, Inc., New York, 1935. $2.00.*

The small sum asked for this monumental little book is ridiculous. After 32 pages of clear and generally nontechnical explanatory text, there follow 39 charts, in many colors, most beautifully printed. An ordinary magnifying glass is unable to detect anything else than the hair-line register of one colored plate upon the other to produce these excellent miniatures. That they have been taken from the classic charts of Frohse, Broedel and Schlossberg only argues for their greater accuracy.

THE BIOLOGICAL EFFECTS OF RADIATION, Benjamin M. Duggar, *McGraw-Hill Book Co., New York, 1936. $12.00.*

Dr. Duggar has edited a series of forty three authoritative papers on almost every conceivable phase of radiation by eminent national authorities on the subject for and at the request of the National Research Council. It is a monumental two-volume work worth every cent asked for it, and an indispensable adjunct to the physiological section in the biological library.

THE GARDEN ENCYCLOPEDIA, E. L. D. Seymour; *Wm. H. Wise & Co., New York, 1936. $4.00 cloth, $5.00 artcraft.*

Garden lovers who cannot afford Bailey's "Encyclopedia of Gardening," or are deterred by his scientific "Hortus" would do well to purchase this intelligently organized and assembled book. Its 1300 pages constitute a mine of handy information for every garden lover, owner or worker.

HUNTING WILD LIFE WITH CAMERA AND FLASHLIGHT, George Shiras 3rd; *National Geographical Society, Washington, 1936. $5.00.*

This two-volume set of books is illustrated with 950 photographs by the author, and forms a valuable record of sixty-five years of photographic exploits among the wild. It forms a valuable addition to our ecological literature in that most of the pictures are devoted to rare and little known forms of life.

INVERTEBRATE PALEONTOLOGY, W. H. Twenhofel and R. H. Shrock; *McGraw-Hill Book Co., New York, 1935. $5.00.*

For too long the biology teacher to whom some inquisitive student brought a fossil has had to dash to the geology shelves in the library to identify the group to which the prehistoric remains belonged. Practically all the available information was carefully stowed away in the "historical geologies!" Now, Drs. Twenhofel and Shrock have given us a well-illustrated and handy reference work to solve our problems.

That its main purpose is to be a text is of course a foregone conclusion, but a lot of us biology instructors are going to find it helpful.

LILIES, H. D. WOODCOCK and J. COUTTS, *Charles Scribner's Sons, New York, 1935. $6.00.*

Garden-hobbied biologists will rejoice at the publication of this new work on those aristocrats of the yard. It is a book very difficult to review, inspiring at once all the admiration one is capable of for the beautiful illustrations, as well as an insanely acquisitive stimulus to go out and, by fair means or foul, start one's own lily garden. Get a copy of the book if you like lilies and don't believe the reviewer.

MAN THE UNKNOWN, ALEXIS CARREL, *Harper & Brothers, New York, 1935. $3.50.*

This is the book that "stumped" the reviewers. Here is the summation of the life philosophy and the outlook of one of the greatest living American scientists, a member of the Rockefeller Institute, and starred in the 'American Men of Science.' And what a philosophy of life it is! The author evidently believes in, and finds a place in his life, for miracles, prayer, mysticism, and all those other imponderables which so many in our modern world would have us scrap as worn out relics of a bygone age. To those who still feel that he is right, that there "are more things in heaven and earth "than are dreamed of in our philosophy" this will be a reassuring book. To others it will either be disturbing or pure bunkum.

NATURE IN THE WILD, FRANCES PITT*; Charles Scribner's Sons, New York, 1936. $2.00.*

Of all the books of animal photography that have come our way for review none even approach this work in beauty of execution or choice of subjects. It is a work enduring art, catching the pure beauty of the animal world still or in action.

PRINCIPLES OF BIOLOGY, G. WADDINGTON and MONICA TAYLOR; *John Murray, 50 Albemarle St., London, W. 1935.*

The American who picks up this handy little British biological text is in for a healthy intellectual jolt. First it is written for English *children* yet it would give the average American college freshman some very bad moments. Secondly, its authors take a lot of our popular scientific shibboleths for an altogether jolly ride, without seeming to do serious damage to the scientific value of the book. Finally, they have livened up more than one chapter with bits of biological verse, alas, too few,—as for instance:

Amoeba proteus first we see—
A protoplastic blob is he—
A marvel of simplicity.
He changes oft and travels far,
Extruding pseudopodia.

* * * * *

Devoid of nervous system, he
Lives by irritability.
Unto his kind he makes addition,
He multiplies by simple fission;
The parts survive without a fuss,
Provided they have nucleus.

PROTOPLASM, WILLIAM SEIFRIZ, *McGraw-Hill Book Co., New York, 1936. $6.00.*

The constant development of our knowledge of the cell and its structure not only made a science in itself of Cytology, but now bids fair to subdivide that important and interest-challenging field. This text confines itself to organized living matter, and thus becomes a very helpful, if not absolutely necessary, adjunct to every course in cytology, and, perhaps, histology. It is well and interestingly written, a fact which places it in that agreeable borderland between the textbook and the reference work *ex professo.* It should rate as an exceptional text.

RHODODENDRONS AND AZALEAS, CLEMENT G. BOWERS; *The Macmillan Co., New York, 1936. $10.00.*

More middle-western and south-central garden lovers should get acquainted with the possibilities of azalea and rhododendron culture. Few people realize that there are boreal forms, and forms that are, contrary to the popular opinion, not altogether intolerant of limestone soils. The publication of works such as this should be an incentive to more experimental ecology in home and campus gardens,—our lives would be less drab, and our gardens more colorful, for it.

TWENTY YEARS UNDER THE SEA, J. E. WILLIAMSON; *Hale, Cushman and Flint, Boston, 1936. $2.50.*

Call this adventure, call it travel, call it natural history, or call it ecology, as you will, it qualifies in all classes. The adventure is thrilling and true. The travel, to be sure, is mostly perpendicular, not lateral. The Natural History is accurate. The ecology is scientifically correct, as well as interesting. What more could one ask?

WILD FLOWERS, HOMER D. HOUSE; *The Macmillan Co., New York, 1935. $7.50.*

Wherever taxonomy of American wild flowers is taught, wherever flower lovers wish to become acquainted with the forms they see on their rambles, wherever authentic fac-similes of actual forms are needed,—in all these places this book will be invaluable. The plates have been on the market before in the publications of the State of New York. The Macmillan Company has done American botany a service in making them so reasonably and readily obtainable.

AMERICAN BIRD BIOGRAPHIES, ARTHUR A. ALLEN; *Comstock Publishing Co., Inc., Ithaca, 1934. $3.50.*

The charmingly autobiographical first person in which the twenty life histories of as many characteristically American bird forms are told gives an added interest to the wealth of ecological lore herein contained. While this is not a "children's book" there is no doubt that many a child will like it, particularly if the excellent photographs are shown with the reading or telling of these stories.

AMERICAN FERNS, EDITH A. ROBERTS and JULIA R. LAWRENCE; *The Macmillan Co., New York, 1935. $2.50.*

There is a breath of the deep dank and ferny woods in this book from the very first page. Yet it is no trite and typical "How to Know" production. The value of the fern both in naturalistic home landscaping as well as in the broader field of scenic road building is carefully covered. One notes with approval the techniques for growing one's own sporelings, the tabulated seasonal usefulness, the distribution in the various ecological associations as well as the helpful key to identification.

AN AQUARIUM BOOK FOR BOYS AND GIRLS, ALFRED MORGAN; *Charles Schribner's Sons, New York, 1936. $2.00.*

The perennial appeal of aquaria and terraria has been skillfully embodied in this attractive book for young people. It deserves a large sale and larger popularity, not only for the joy it will give scientifically minded children, but also for the scientific lore it will convey.

BACKYARD EXPLANATION, PAUL GRISWOLD HOWES; *Doubleday Doran & Co., Garden City, 1935. $3.00.*

Every biologist worth his salt knows that whether his environment be land, water or air, practically every cubic inch of it palpitates with life. Few biologists have reverted to the microscopist tactics of the early natural historians to prove the point. That the task has been admirably accomplished seems evident from this interesting work. Attractively written text-material has been exemplified in a host of helpful sketches and hitherto unused photographs of unusual interest.

THE BEGINNINGS OF PLANT HYBRIDIZATION, CONWAY ZIRKLE, *U. of Penn Press, Philadelphia, 1935. $2.50.*

This first in the Morris Arboretum Monograph Series from the Pennsylvania press is a decided achievement. It successfully canvasses the hybridization literature from the Assyrians to Schreber and Linnaeus in a highly interesting as well as accurate fashion. The genetics library is incomplete without it.

A BIOLOGY OF THE PROTOZOA, GARY N. CALKINS; *Lea & Febiger, Philadelphia, 1933. $7.50.*

Of perennial interest as well as importance is this well-known textbook on the Protozoa. So authoritative is it for an understanding of the American protozoon population that no college, and, still more, no zoology teacher's library can afford to be without it. It is one of our biological classics.

BRITISH STEM AND LEAF FUNGI, Vol. I, W. B. GROVE, *Cambridge University Press, Cambridge, 1935. $7.00.*

This key to the Coelomycetes in its first volume goes only as far as limits of the Scolecosporae, terminating with the Sphaerioideae with colorless or nearly colorless spores. There are few illustrations, but the work is done with that thoroughness we associate with most English botanical work. Valuable for mycological reference.

CLEMATIS, ERNEST MARKHAM; *Charles Scribner's Sons, New York. 1935. $2.00.*

Another handbook on growing garden types which will meet with a warm reception on this side of the Atlantic. Clematis is an easily grown, ornamental vine which produces a wealth of distinctive flowers each season. It should be better known. Perhaps this book will help to spread it.

COLLEGE BIOLOGY, ULRIC A. HAUBER; *Edwards Brothers, Ann Arbor, 1936.*

This second part of a college text reviewed in our last issue maintains the high level set for it by its predecessor. Of particular interest are the last four chapters dealing with primitive man, the biological basis of human society, biology and mind, and the history of biology respectively. Here is what is being taught on these vital subjects in Catholic colleges in this country. The very objectivity of the author's presentation makes it authoritative.

DEEP SEAS AND LONELY SHORES, W. L. PUXLEY; *E. P. Dutton & Co., New York. $2.50.*

Untechnical natural history for lovers of popular science told by one of earth's more or less scientific wanderers,—a parlor table sort of book, slightly ecological.

ELEMENTARY BACTERIOLOGY, JOSEPH E. GREAVES; *W. B. Saunders Co., Philadelphia, 1936. $3.50.*

This newly revised and reset third edition should enhance the value of a standard bacteriological text considerably. For an elementary text the illustrations are unquestionably superior.

ELEMENTS OF GENERAL BIOLOGY, HENRY R. BARROWS; *Farrar & Rinehart, Inc., New York, 1936. $2.50.*

This elementary biology was nearly completed at the time of the late lamented author's death, and has been produced in accordance with his plans and wishes. He was evidently more of a zoologist than a botanist, and those whose previous training or interests lead them to a more zoological viewpoint on biology should find this an easy book to teach.

THE ENDLESS QUEST, F. W. WESTAWAY; *Hillman-Curl, Inc., New York, 1936. $5.00.*

This well indexed volume of 1080 pages modestly claims to be an encyclopedia of science. If it were more objectively reliable it might approximate that claim. As to its authorship,—evidently the World War is not over. The Imperial Lion roars on too many pages.

EVOLUTION, A. FRANKLIN SHULL; *McGraw-Hill Book Co., New York, 1936. $3.00.*

This is the most authoritative recent work on the much discussed and belabored subject of evolution. The scholarship of the author is above question, and the results of his labors are carefully collated and annotated.

FERNS OF THE VICINITY OF NEW YORK, JOHN KUNKEL SMALL; *The Science Press, Lancaster, 1935. $2.50.*

Here is a carefully produced, and adequately illustrated by accurate drawings, hand book to the ferns in a hundred-mile radius of Manhattan Island. While the area is small, it is fairly representative of much that can be expected both in eastern and coastal states, so the book should have a healthy circulation in that area. To taxonomists of other regions it will also prove useful, especially when their collections contain specimens from this area.

FLORA OF NELSON COUNTY KENTUCKY, SISTER ROSE GREENWELL; *1935*, FLORS OF BEXAR COUNTY TEXAS, SISTER MARY METZ; *1934, Catholic University of America, Washington, D. C.*

Two county floras carefully catalogued and keyed. Should be of interest to every taxonomist in the particular states, as well as to all students of comparative taxonomy.

FLOWER ARRANGEMENT, F. F. ROCKWELL and E. C. GRAYSON, *The Macmillan Co., New York, 1935. $3.00.*

For years we have wondered why someone did not follow the lead of that delightful but, unfortunately, now nonexistent magazine, THE CRAFTSMAN, and work out a system of flower arrangement. We can still recall the thrill that stimulated our jaded artistic sense when we saw the possibilities of a single spray of white pine in combination with a few white Narcissi. The "kick" came back when we opened this book. It is worth all that is asked for it, and for those biologists who want to make their homes distinctive a veritable gold-mine.

FOR AND AGAINST DOCTORS, R. HUTCHINSON and G. M. WAUCHOPE; *William Wood & Co., Baltimore, 1935. $2.00.*

Here a pair of medicos see themselves as others see them, and collecting the accumulated data, present it to us for our diversion as well. Certainly this must be the golden age of medicine, if we may judge the position of modern medical practitioners in comparison with their much maligned, and malingering, ancestors in the profession.

FOUNDATIONS OF BIOLOGY, L. L. WOODRUFF; *The Macmillan Co., New York, 1936. $3.50.*

The well-merited popularity of this serviceable college text has necessitated a fifth edition which carries on the tradition of its predecessors so ably that there is no question but that the book will continue to attract new friends while maintaining all the old ones.

FOUR HEDGES, CLARE LEIGHTON, *The Macmillan Co., New York, 1935. $3.00.*

A gardener's chronicle that runs through the horticultural year from April to the following March, this book in its thematic treatment is reminiscent of that charming essay by Sir Francis Bacon, on the making of gardens, to which have been added on nearly every page, beautifully executed wood cuts by the author. It is a delightful book.

THE FORESTRY PRIMER, C. L. PACK; *American Tree Association, 1214 16th St., Washington, 1936. Free.*

Biologists who expect to go into the teaching profession, either as high school instructors or as college assistants should get themselves on the mailing list of the American Tree Association. We use the term "biologists" in its widest sense. Zoologists and Physiologists are just as much to be concerned in the future of our natural resources as are professional botanists. Those who are unconcerned about ecological associations and the habitat phases of biology can hardly rate themselves as broadminded scientists, and are missing some of the most telling ways of making the biological fields vital to their students.

GENERAL INTRODUCTION TO FORESTRY IN THE UNITED STATES, N. C. BROWN; *John Wiley & Sons, Inc., New York, 1935. $3.25.*

This far-sighted general text covers so much of the entire field that it makes an effective introduction to Forestry. Perhaps no more dynamic publication has been issued this year in any of the broadly biological fields. It should challenge the interest of all those who have the economic welfare of the country at heart.

GENETIC VARIATIONS IN RELATION TO EVOLUTION, H. S. JENNINGS; *Princeton University Press, Princeton, 1935. $2.00.*

This series of five lectures in the Louis Clark Vanuxem series presented at Princeton in December of 1934, affords the interested student a highly authoritative discussion of observed types of inherited variation in relation to evolutionary change. The results are not encouraging to the usual popular evolutionary concepts. The search for the unknown factor in evolution, as Osborn phrased it, must still go on.

GHOSTS I HAVE TALKED WITH, HENRY C. MCCOMAS; *The Williams & Wilkins Co., Baltimore, 1935. $2.00.*

A member of the department of Psychology at Johns Hopkins University makes an interesting contribution to the debunking of much of our psychic phenomena. His story of the seance he conducted is diverting.

HEAD, HEART AND HANDS IN HUMAN EVOLUTION, R. R. MARETT; *Henry Holt, New York, 1935. $3.50.*

We thought this was a physiological treatise on evolutionary development. Imagine our surprise to find it a very human, chatty and charming series of papers on human anthropology by the Rector of Exeter College. The book is popularly done, as the author freely admits, but that, for an Englishman, merely makes him understandable for us Americans.

HISTORY OF THE UPPER MISSISSIPPI, W. S. COOPER; *University of Minnesota Press, Minneapolis, 1935. $4.00.*

This is a study of glacial geology by a botanist. As a result of what the author calls "the cross-fertilization of the sciences" it augurs well for future developments along the line of a greater rapprochement between the various fields of knowledge.

HUMAN ECOLOGY, J. W. BEWS; *Oxford University Press, New York, 1935. $5.00.*

With an introduction by the famous philosopher-ruler-and-general, the Right Honorable Jan C. Smuts, this fine book gets off to a flying start. It should be on the required reading list in every course in anthropology, sociology and economics.

HUMUS, SELMAN A. WAKSMAN; *Williams & Wilkins Co., Baltimore, 1936. $6.50.*

This exhaustive treatise on a very important but often neglected botanical requisite is divided into three parts discussing the historical development of our knowledge of the chemical nature of humus, its formation, and its role in plant nutrition; the origin and nature of humus; and, the decomposition of humus, its functions and applications. A bibliography of 1311 titles guarantees its thoroughness.

A HUNDRED YEARS OF ANTHROPOLOGY, T. K. PENNIMAN; *The Macmillan Co., New York, 1936. $4.50.*

The secretary for the committee on anthropology at Oxford has written this helpful, and on the whole, interesting book on the developments in his field since 1835. It is valuable for its interpretation of the more recent advances and their interpretations in the hands of the leaders in the science.

THE INSANITY PLEA, E. H. WILLIAMS; *Williams and Wilkins Co., Baltimore, 1931. $2.00.*

A former practicing attorney now professor of political science says of this book: "Here is a series of reminiscences of an experienced "expert alienist." It is not scientific either in content or form. The Chief of Police of Los Angeles contributes a short introduction which does nothing to save the little book,—obviously designed as popular reading,—from becoming positively puerile."

INSECT ENEMIES OF SHADE TREES, GLENN W. HERRICK, *Comstock Publishing Co., Ithaca, 1935. $5.00.*

Reawakened interest in our forest heritage and its near depletion has brought the light of public attention to a focus on some of the inhibiting factors to developing shade and forest trees. To one who has seen miles and miles of Cape Cod beech woods standing stripped and dying as a result of a caterpillar invasion, such a text as this is indeed a welcome sign of intelligent application to another of our national problems.

AN INTRODUCTION TO BIOLOGY, E. L. RICE; *Ginn and Company, Boston, 1935.*

An elementary textbook for beginning students. It is unusual that eight of the earlier chapters are devoted to the problems of human physiology, the next eight are allotted to the frog, and the lesser half of the rest of the book to all the usual fields of biology, including the plant and animal world.

INTRODUCTION TO THE PHILOSOPHY OF EDUCATION, Michael Demiashkevich; *American Book Company, New York, 1935.*

It is decidedly refreshing to find a Russian (not Soviet) educator who frankly takes as his standard "Prove all things; hold fast that which is good." (1 Thess. V, 21) If there is any field in which a more considerate speed, or, as Francis Thompson put it "a majestic instancy" would be a blessing, it is in education where the pace of change is so terrific that one hardly knows from day to day just what current theory is *comme il faut.*

INTRODUCTION TO HUMAN PARASITOLOGY, Asa C. Chandler; *John Wiley & Sons Co., New York, 1936. $5.00.*

A fifth rewritten and enlarged edition of Chandler's classic text is endorsement sufficient for its practical usefulness. Much of the old fourth edition has been rewritten to insure the book's being up-to-the-minute on the most recent discoveries in parasitology.

INVERTEBRATE ZOOLOGY, Gilman A. Drew; *W. B. Saunders Co., Philadelphia, 1936. $2.25.*

Gilman Drew's classical handbook of laboratory technique in invertebrate zoology has been given a thorough revision by Drs. J. Dawson and L. P. Sayles, so that it is thoroughly up to date. It will hold its old friends and make new ones.

LABORATORY GUIDE IN ANIMAL BIOLOGY, R. H. Wolcott and E. F. Powell; *McGraw-Hill Book Co., New York, 1935. $1.00.*

Twenty-three laboratory exercises in zoology to accompany the recent textbook of Dr. Walcott. It looks practical and should prove easy to use in lab sections.

LAWS OF LIFE, H. Sutherland; *Sheed & Ward, New York, 1936. $2.50.*

Hygiene of a high order with the moot questions of birth control, alcohol, Malthusianism, eugenics, war, and euthanasia rather objectively treated. Many biologists of more or less restricted views will absolutely disagree with the author's conclusions, but he backs them up with evidence that cannot be pooh-poohed into silence,—at least by honest scientists.

LETHAL EFFECTS OF SHORT WAVE LENGTHS OF THE ULTRAVIOLET ON THE ALGA CHLORELLA VULGARIS, Florence E. Meier; *Smithsonian Institution, Washington, 1936.*

This is the report which received so much national publicity. It is of interest to botanists and to the physiologists specializing in radiation.

MAN, THE UNIVERSE BUILDER, Richard E. Lee, *Williams & Wilkins Co., Baltimore, 1935. $3.00.*

A highly stimulating series of special pleadings for a harmonized and unified attitude toward science, not as so often seen bit by bit. The publishers claim that this is "a truly magnificent attempt to show man his relation to his environment."

MEDICAL MYCOLOGY, Carroll William Dodge; *The C. V. Mosby Company, St. Louis, 1935. $10.00.*

One of the most outstanding gaps in biological literature has been met at last in the publication of Dr. Dodge's Medical Mycology. Attacking the more or less scattered literature on the fungous diseases of men and other mammals, the author has not only given their morphology and physiology, but he has also indicated the treatments which have thus far given best results. The book will therefore be invaluable to all the members of the medical profession, as well as to our hygienic and commercial laboratories.

THE MIGRATIONS OF ANIMALS FROM SEA TO LAND, A. S. Pearse; *Duke University Press, Durham, North Carolina, 1936. $3.00.*

The fascinating problem of the migrations of animals to and from the water here receives its meed of attention from one who, perhaps of all American zoologists, is by nature and interest best fitted to attack the problems thus presented.

THE MUSHROOM HANDBOOK, Louis C. C. Krieger; *The Macmillan Co., New York, 1936. $3.50.*

Mushroom lovers, epicures all, who like to collect their own edible fungi should welcome this book. It is profusely illustrated, with a lot of accurately colored pictures emphasizing the common type characteristics. The book is not too large to go into the coat pocket easily.

THE NATURE OF A BIRD'S WORLD, ELIOT HOWARD; *Cambridge at the University Press, or The Macmillan Co., New York, 1935. $2.50.*

This is the sort of bird-study Charles Darwin would have appreciated. It is the result of long and patient observation of life in the bird world. The work is a welcome addition to our ecology and animal behavior.

A NATURAL HISTORY OF THE SEAS, E. G. BOULENGER; *D. Appleton-Century Co., New York, 1936. $3.00.*

A popularly written series of papers dealing with marine forms from the simplest up to the largest mammals. There is a delightful closing chapter on sea monsters. It is another of the interesting side-reading books from which to cull incidents and explanatory illustrations for one's lectures.

OUR ENEMY THE TERMITE, THOMAS E. SNYDER; *Comstock Publishing Co., Ithaca, N. Y., 1935. $3.00.*

It is an encouraging aspect of modern science that it is looking forward into future emergencies. Dr. Sears did it in "Deserts on the March," and so does the author of the present volume. The Termites are a growing problem. Seemingly they are acquiring characteristics fitting them to better withstand colder and colder climates so that the day may not be far off when they will be one of our major national problems. Dr. Snyder's book deserves thoughtful consideration.

ORDER AND LIFE, JOSEPH NEEDHAM; *Yale University Press, New Haven, 1936. $2.50.*

The twelfth series of lectures on the Terry Foundation at Yale were given by a member of the Cambridge faculty. They are mainly biochemical, with a strong philosophical flavor. The position of the lecturer and his being chosen to present his series at Yale warrant him a respectful amount of attention.

AN OUTLINE OF GENERAL BIOLOGY, GORDON ALEXANDER; *Barnes & Noble, Inc., New York, 1935. 75¢.*

This booklet is designed to be a sort of companion volume to any textbook of general biology. The author is a little behind the times in picturing and describing a spireme in caryokinesis,—most of the more modern texts are dropping the term entirely.

OUT OF THE NIGHT, H. J. MULLER; *The Vanguard Press, New York, 1935. $1.50.*

Principles of the U. S. S. R. under a thin veil of science, "quo usque tandem Catalina.

PACIFIC COAST TREES, H. E. McMINN and EVELYN MAINO, *University of California Press, Berkeley, 1935. $3.50.*

Illustrated with both drawings and photographs, this handy pocket size manual should prove of considerable value not only to residents of the west coast states, but also to botanically awake travellers in the region.

A PARADE OF ANCIENT ANIMALS, HAROLD O. WHITNALL; *Thomas Y. Crowell Co., New York, 1936. $2.00.*

A child's book of prehistory, with all the big words carefully syllabified. A little scientific for very young or nervously impressionable children, but a mine of lore for those a little older, and what a trap for question-answering parents?

POLLEN GRAINS, R. P. WODEHOUSE, *McGraw-Hill Book Co., New York, 1935. $6.00.*

One of those surprising weird turns so common to science and constituting one of its ever-possible and challenging qualities, is well exemplified in the story of pollen. From the very beginning of microscopic investigation pollen was known. Gradually its place in fertilization was discovered. Then for a long time pollen was only an accepted part in the life-cycle of plants, something for plant-histologists, and perhaps taxonomists to worry about. Then, suddenly, pollen enters the limelight of popular as well as serious science, the dread cause of hayfever. The impetus this new discovery gave to pollen study was equalled by a third discovery, the persistence of pollens in prehistoric coal measures and in peat bogs, and the possibility of tracing whole successions through previous epochs by means of borings through successive layers of ancient bogs. This text covers both fields acceptably.

PRACTICAL PROBLEMS IN BOTANY, W. W. ROBBINS and J. ISENBARGER; *John Wiley & Sons, Inc., New York, 1936. $2.00.*

A high school botany text of special value if it follows a course in biology or general science. Has many interesting features, particularly in the suggested laboratory and field work. Plant classification, and the study of plants along traditional lines, are not conspicuously evident.

PRINCIPLE OF ANIMAL PSYCHOLOGY, N. R. F. MAIER and T. C. SCHNEIRLA; *McGraw-Hill Book Co., New York, 1935. $4.00.*

Fundamental principles discernible in the behavior of animals from the plants and protozoa all the way up through the birds to the mammals, form a connected series of discussions which should be helpful to all psychologists, and at the same time prove a mine of information to those biologists who desire to "socialize" their courses.

PROCEDURE IN TAXONOMY, E. T. SCHENK and J. H. MCMASTERS; *Stanford University Press, Stanford University, Calif. $2.00.*

Zoologists and paleontologists who do much identifying and classifying new forms need this very practical handbook in correctly naming and announcing their contributions to the scientific world. The book includes a reprint of the International Rules of Zoological Nomenclature.

SOCIAL BIOLOGY, E. P. WALTON and P. E. FOSS; *P. Blakiston's Son & Co., Philadelphia, 1936. $1.68.*

Why can't some of our college texts be as reasonably priced as these new high school books? Here is a compact handy text in a washable cover, with 360 well selected illustrations, and about the most intelligently sensible text-matter we have yet come across. It deserves a wide adoption and continued popularity. In its discussion of alcohol and tobacco the authors are refreshingly original in omitting the usual morbidly mortician details, and the poor, dead fish in the aquarium through which smoke had been bubbled!

THE STORY OF THE PLANT KINGDOM, MERLE C. COULTER, *The University of Chicago Press, Chicago, 1935. $3.00.*

This textbook is one of the botanical 'first fruits' of the "New Plan" in education which is the University of Chicago's gift to a hide-bound teaching world. After a careful study of this book we are not so sure that Chicago isn't on the right track. To anyone who is teaching, or expects to teach, botany under any of the various systems, and with any of the many excellent texts, now in vogue in this country, we heartily recommend a purchase and frequent use of this text as an orienting factor. It is an objective thesis, disturbingly susceptible to a lot of proof, that many of our best professors,—and *afortiori* their younger laboratory or quiz instructors,—get so immersed in their subject each semester that they do not see the woods for the trees. This book should be a valuable aid to the instructors,—one can't do much with the professors anyway.

THE STUDENT'S MANUAL OF MICROSCOPIC TECHNIQUE, J. CARROLL TOBIAS; *American Photographic Publishing Co., Boston, 1936. $2.50.*

The microscopists are coming into their own again! In the early days of the Dutch lens grinders microscopy was the fad of the educated tycoon. Later, as microscopes became cheaper they naturally fell into place along with other types of laboratory equipment necessary to the pursuit of the biological sciences. Of recent years, however, the development of so many types of home scientific experimental outfits to settle the questions of inquiring American youth has given a rather emphatic boost to interest in microscopy for its own sake. Whether this is the origin of the book under consideration or not, your reviewer is not competent to judge. At any rate, this is one of the best books we have yet seen for the college student in microscopic technique. It has been widely praised,—and deservedly so.

A TEXTBOOK OF BACTERIOLOGY, THURMAN B. RICE; *W. B. Saunders Co., Philadelphia, 1935. $5.00.*

Careful study of this text corroborates what at first sight might have seemed the extravagant claims made for it. It is shorter, clearer, and more interesting than any other bacteriological text we have yet encountered. Controversial matter has been eliminated, —why are so many of our texts used as theses to maintain authors' positions? —and the result is an eminently teachable book.

THEORY AND PRACTICE OF STUDENT COUNSELING, HUGH M. BELL; *Stanford University Press, Stanford University, 1935.*

An interesting booklet on techniques that are coming to have greater and greater importance in the American educational picture. Biologists should not overlook this type of vocational field for which their previous training forms such an excellent background.

TOMORROW'S CHILDREN, ELLSWORTH HUNTINGTON, *John Wiley & Sons, Inc., New York, 1935. $1.25.*

A catechetical exposition of the principles of the American Eugenics Society.

TWO HUNDRED NINETY-FIVE AMERICAN BIRDS, T. S. ROBERTS; *University of Minnesota Press, Minneapolis, 1936. $2.00.*

Those who were enthusiastic about "Bird Portraits in Color" by the same author, last year will welcome the republication of many of the colored plates in this form. There is no printed textual material, and the binding is the now-familiar spiral type. This, however, permits the removal of any or all the illustrations for framing, and where can one get two hundred and ninety-five bird pictures in color for this price?

VOYAGE TO THE GALAPAGOS, W. A. ROBINSON; *Harcourt Brace & Co., New York, 1936. $3.00.*

Another travel-adventure-natural history book, but one in which the stage is almost completely taken with the two act drama of the weird story of the baroness and the corpses, and the world famous incident of the author's attack of appendicitis in which the United States Navy and its air force played so spectacular a part. The book is good reading, even if it does debunk a lot of this south sea island twaddle.

WHY KEEP THEM ALIVE? PAUL DE KRUIF; *Harcourt Brace and Company, New York, 1936. $3.00.*

If you are sentimental, and like a good cry; if you are "do gooder" and want something to get indignant about; if you know sophomoric cynics who need a tonic of altruism; if you enjoyed "Microbe Hunters"—and who didn't?—you will want this Dutchman's book. It is up to the standard of his past work. What more can be said?

WILD LIFE OF THE SOUTH, ARCHIBALD RUTLEDGE; *Frederick A. Stokes, New York, 1935. $1.75.*

Eighty sharp little vignettes of animal life in the deep south, each a well told story or incident in itself, go to make up this interesting book. There is something to be said for a book of this sort in giving an ecological picture that will linger longer in the memory than many another more trite and stereotyped scientific formula.

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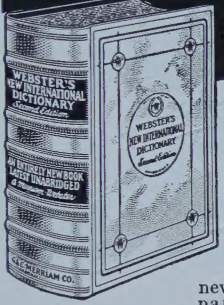

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